PHILIPS

PHILIPS

SPC 38

SERVICE

Scientific & Analytical Equipment
Test & Measuring Instruments
Industrial Controls
Welding
Industrial Data-processing Systems

Scientific & Industrial Equipment Division

Printing date: 790815

This service information supersedes SPC31 and SPC32

Trouble shooting hints and updating of circuit diagrams and spare parts lists for PM 6611 . . . 16, PM 6622 and PM 6624 . . . 25, PM 6661 and PM 6664.

PM 6610 series of counters

Trouble shooting hints 2
Circuit diagrams for PM 6611 and PM 6613 . . . 16 7
Circuit diagrams for PM 6612 27

PM 6620 series of counters

Trouble shooting hints 39
Circuit diagrams 42

PM 6661 80 MHz counter
PM 6664 520 MHz counter

Trouble shooting hints 55
Circuit diagrams 59

Spare Parts

Resistors 66
Capacitors 68
Transistors and diodes 70
Integrated circuits 71
Mechanical parts 72
Inductances 73

Ordering number of this service information: 9499 468 03211

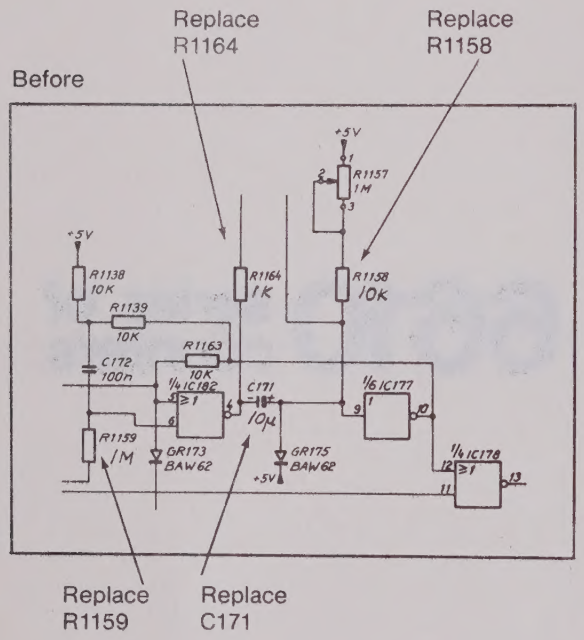
Printed in Sweden

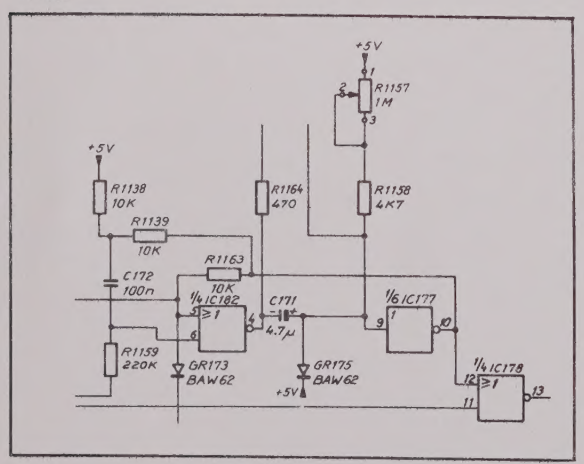
PM 6610 series of counters

Display Circuits

Changing the display time

The display time is changed from 200 ms...5 s to 50 ms...4 s.



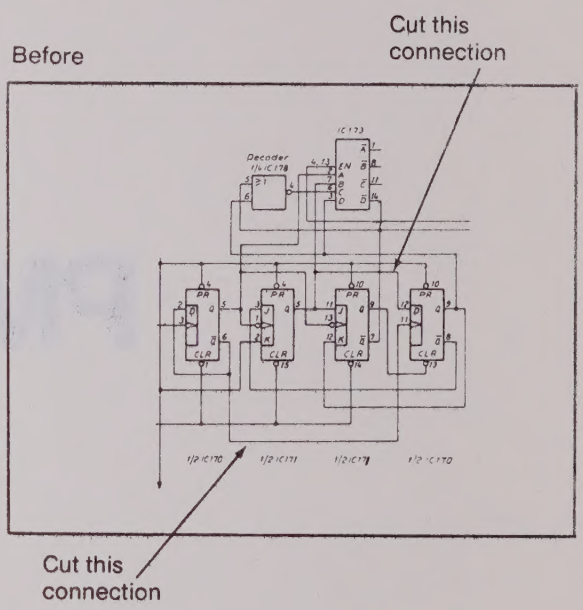


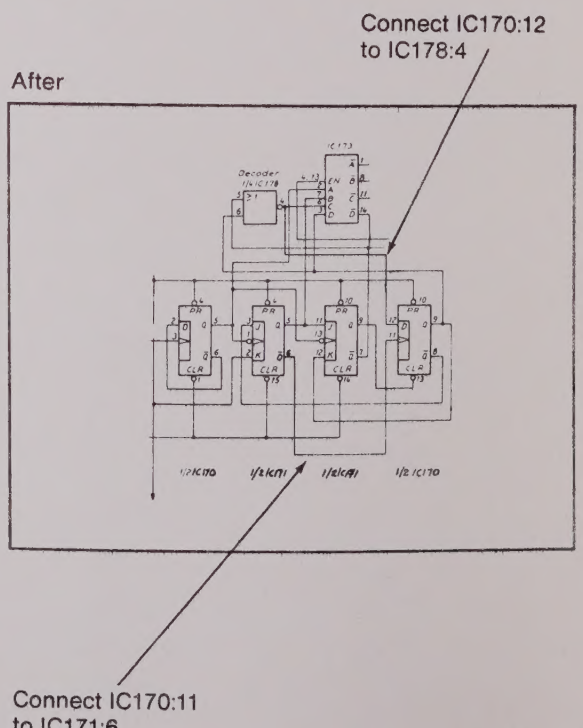
Item	Description	Ordering Number
R1158	4.7 k	4822 110 63125
R1159	220 k	4822 110 63169
R1164	470	4822 110 63098
C171	4.7 µF	5322 124 14064

80 MHz Decade

Improving the 80 MHz decade

Trouble symptom: the least significant digit becomes an u.



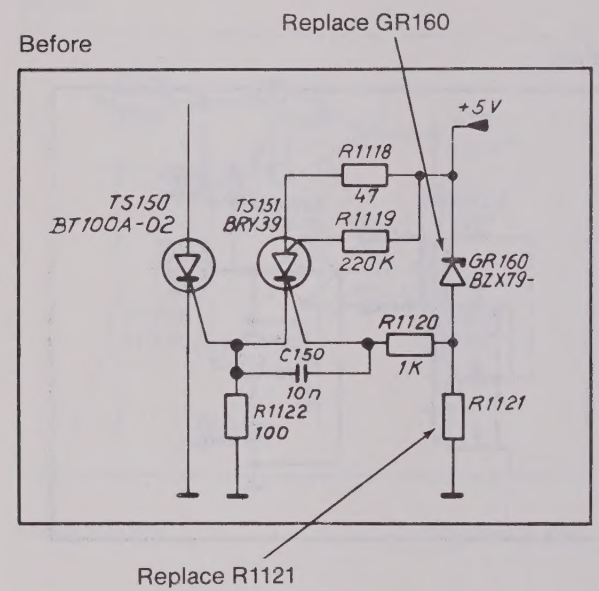


Power Supply

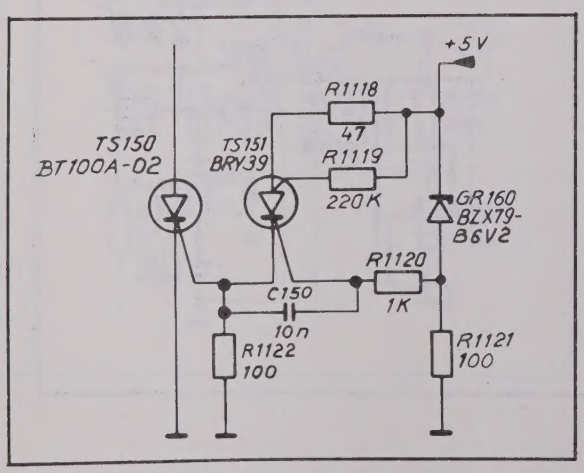
Improving the Crowbar Circuit

Trouble symptom: fuse VL 150 blows when counter is turned on or off.

Before



After



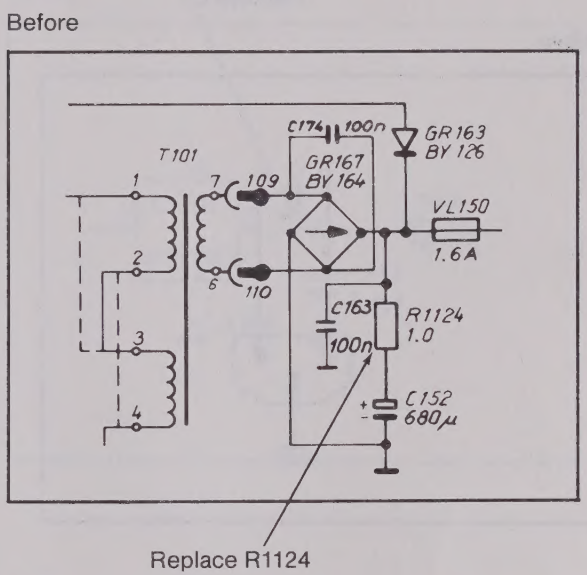
Item	Description	Ordering Number
R1121	100	4822 110 63081
GR160	BZX-79-B6V2	5322 130 34167

Power Supply

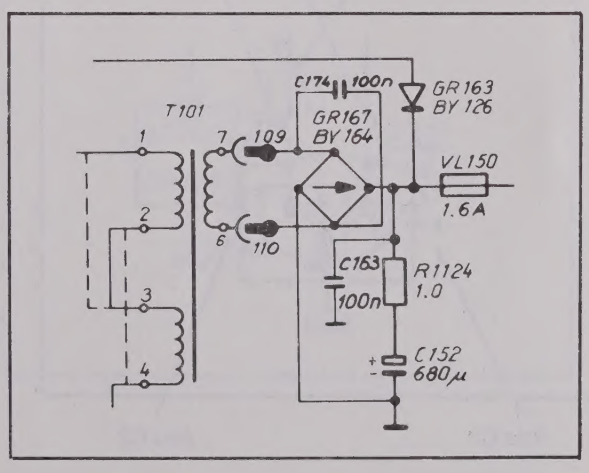
Improving the mains protection circuits

Trouble symptom: fuse VL 150 blows when counter is turned on or off.

Before



After



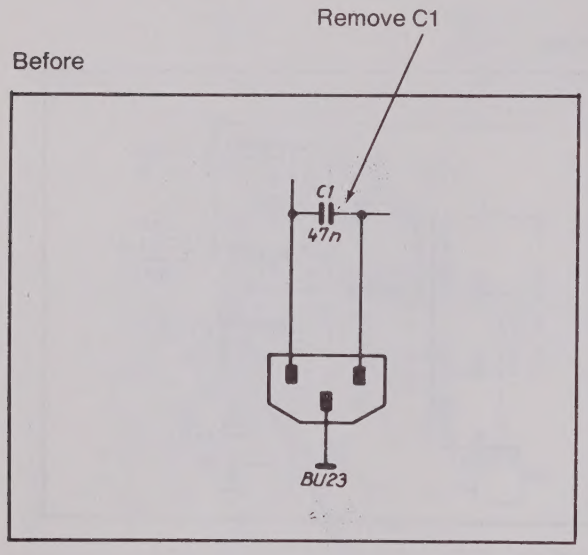
Item	Description	Ordering Number
R1124	1 ohm/wire wound	4822 113 60084

Power Supply

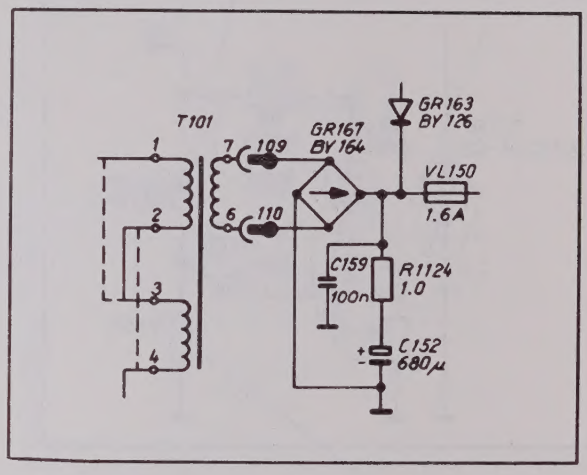
Improving the mains interference protection

Trouble symptom: high frequency interference is affecting radio receiving.

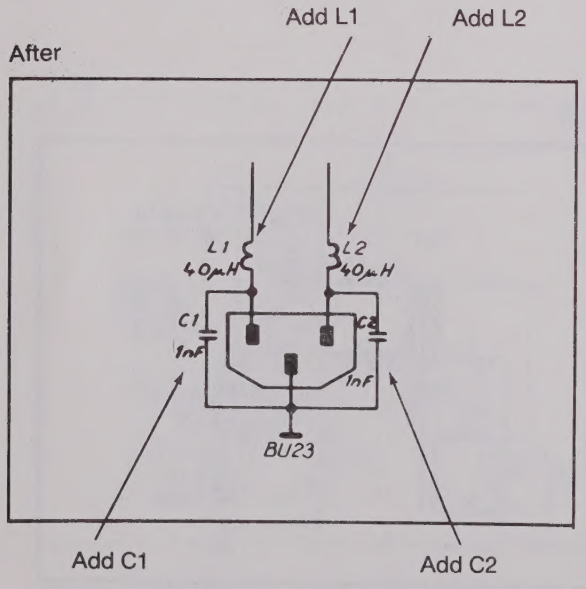
Before



Before



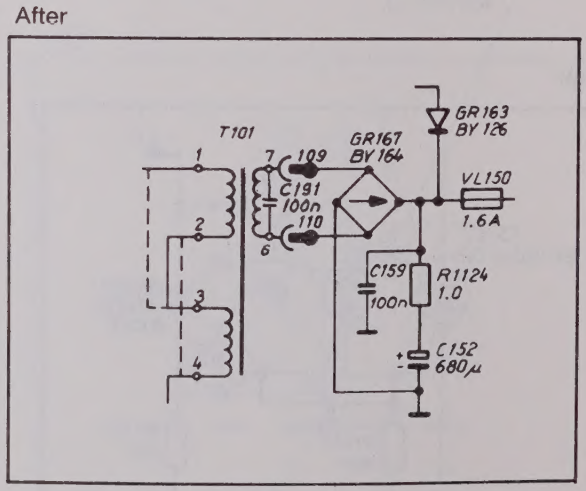
After



Item	Description	Ordering Number
L1, L2	40 µH	5322 121 44235
C1, C2	1 nF	4822 122 31175

After

Add C191



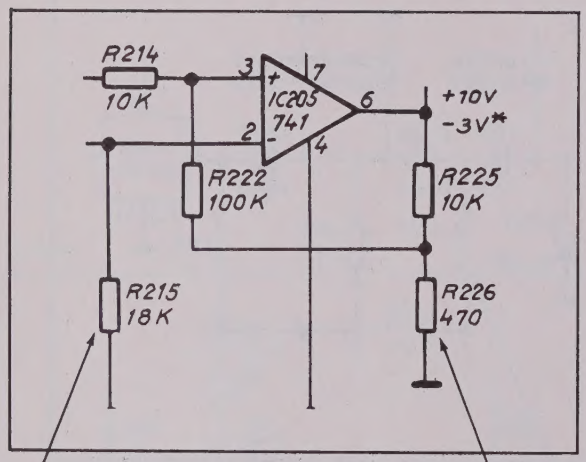
Item	Description	Ordering Number
C191	100 nF	5322 121 40323

Prescaler PM 6614

Improving the sensitivity

Trouble symptom: the sensitivity has a dip in the frequency range 300 MHz to 450 MHz.

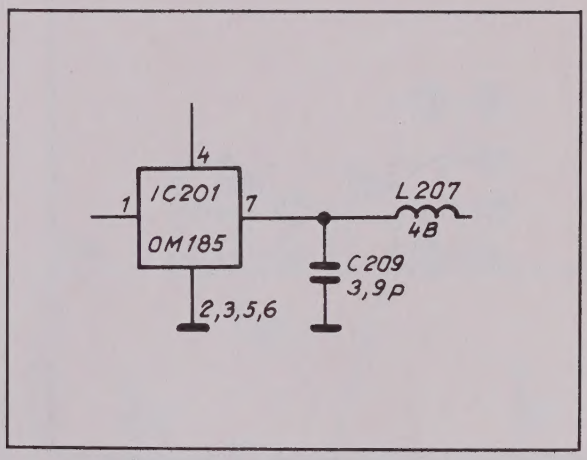
Before



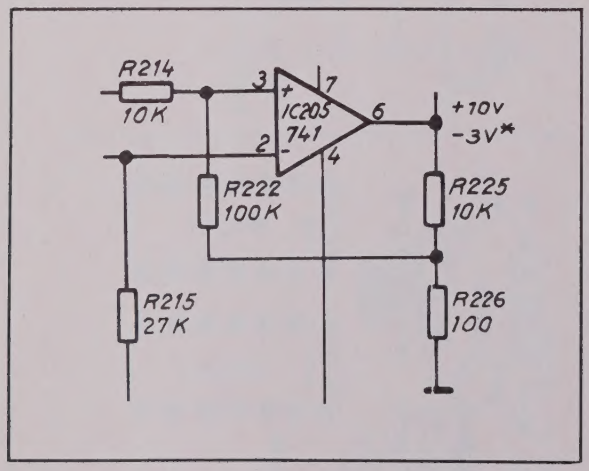
Replace R215

Replace R226

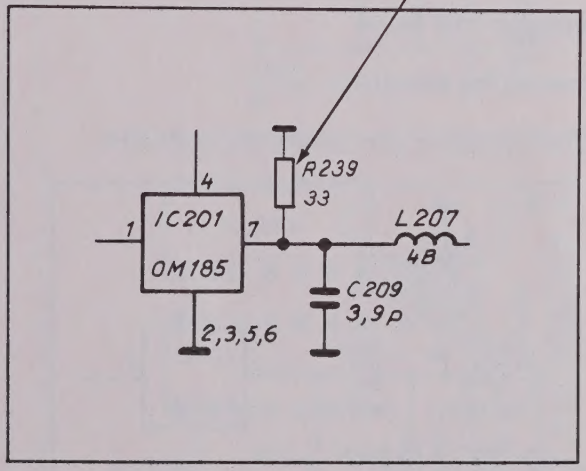
Before



After



After



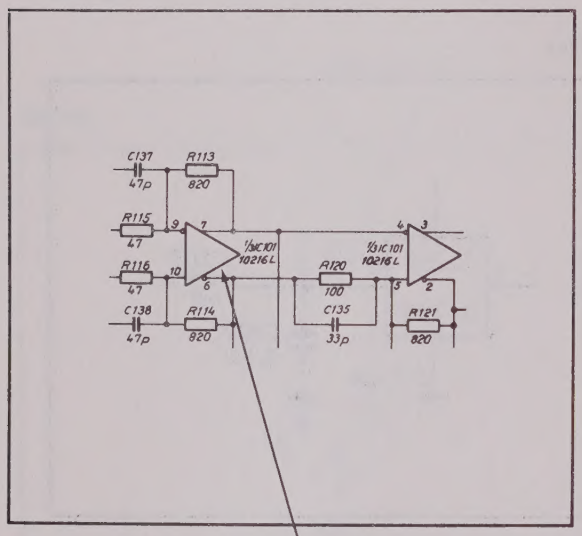
Item	Description	Ordering Number
R215	27 k	4822 110 63145
R226	100	4822 110 63081

Item	Description	Ordering Number
R239	33	4822 110 63067

Input Amplifier

Improving the sensitivity

Trouble symptom: sensitivity is poor specially at 80 MHz.

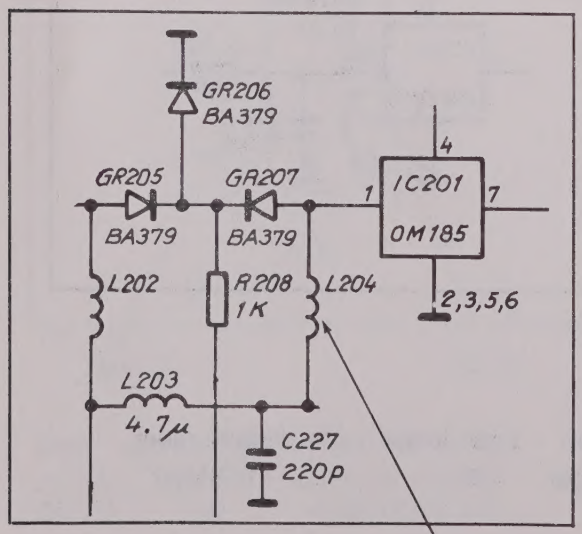


Replace IC 101 with a 10116 or 10216. Choose Signetics if available.

Prescaler PM 6614

Improving the sensitivity

Trouble symptom: poor sensitivity at 40 MHz.

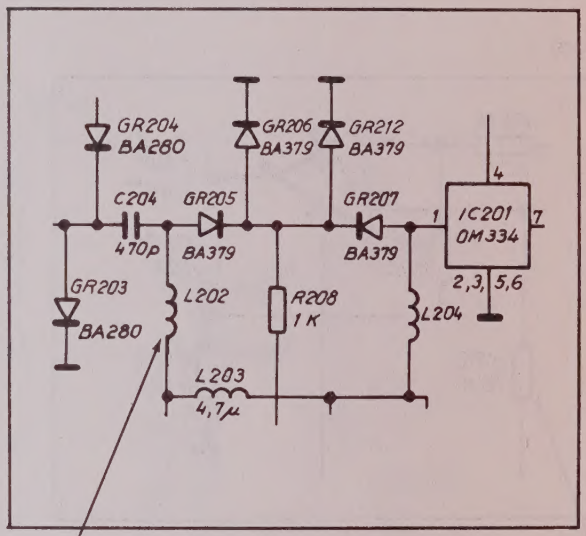


Check L204 for short circuits to ground

Prescaler PM 6615

Improving the sensitivity

Trouble symptom: poor sensitivity at 185 MHz.



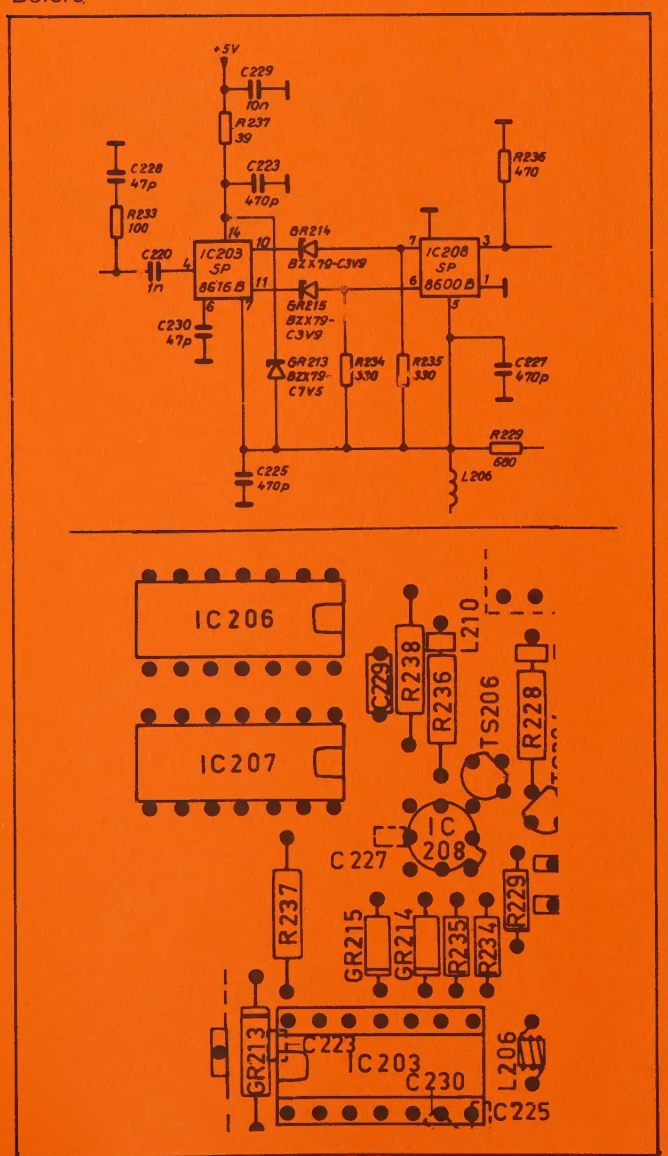
Check L202 for short circuits to ground

Modification of the prescaler unit for PM 6615

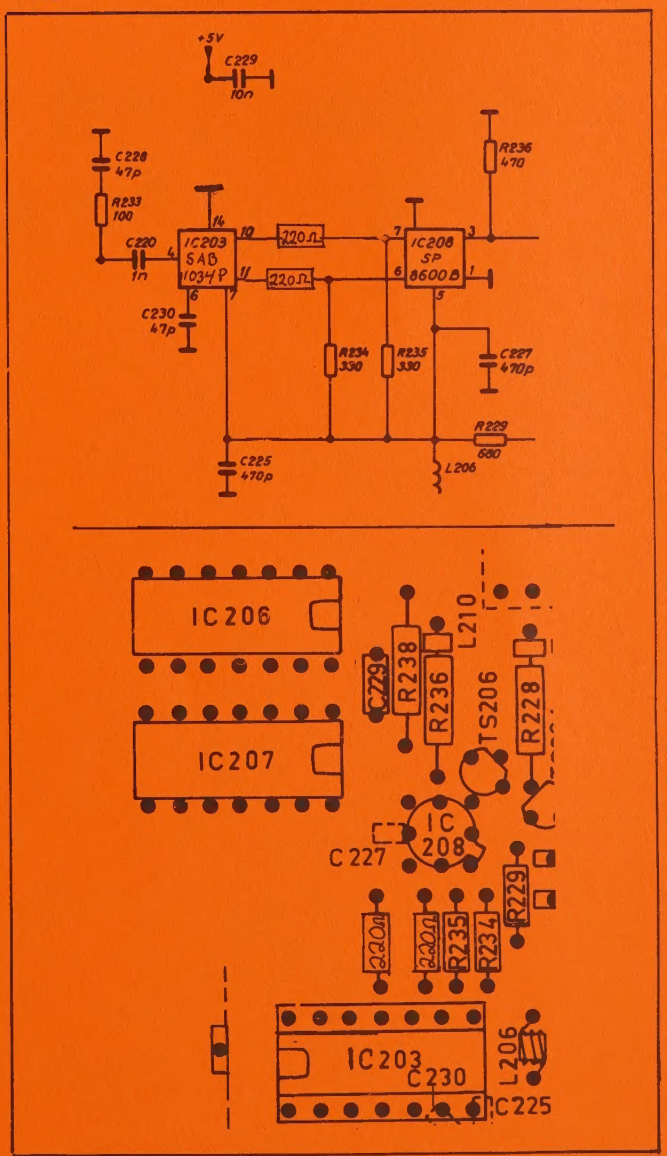
Due to cancelled production of SP8616B from Plessey following modification is introduced in our production line from August 1979.

1. SP8616B is replaced by Philips SAB 1034P or Plessey SP8610B.
2. Terminal 14 of IC203 is earthed.
3. GR214 and GR215 is replaced by two 220ohm resistors of type CR16 from Elcoma.
4. R237, C223 and GR213 are removed.

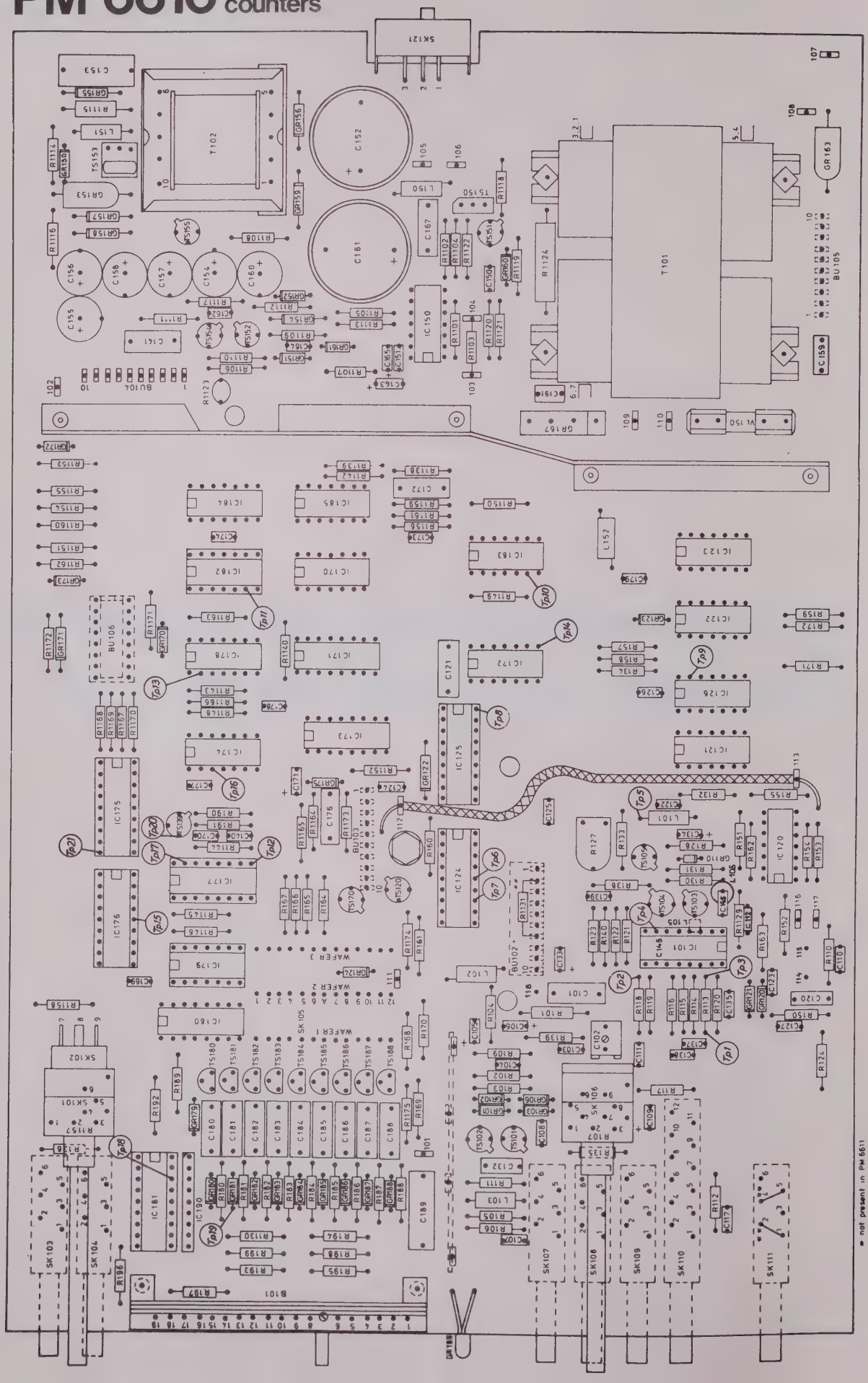
Before



After



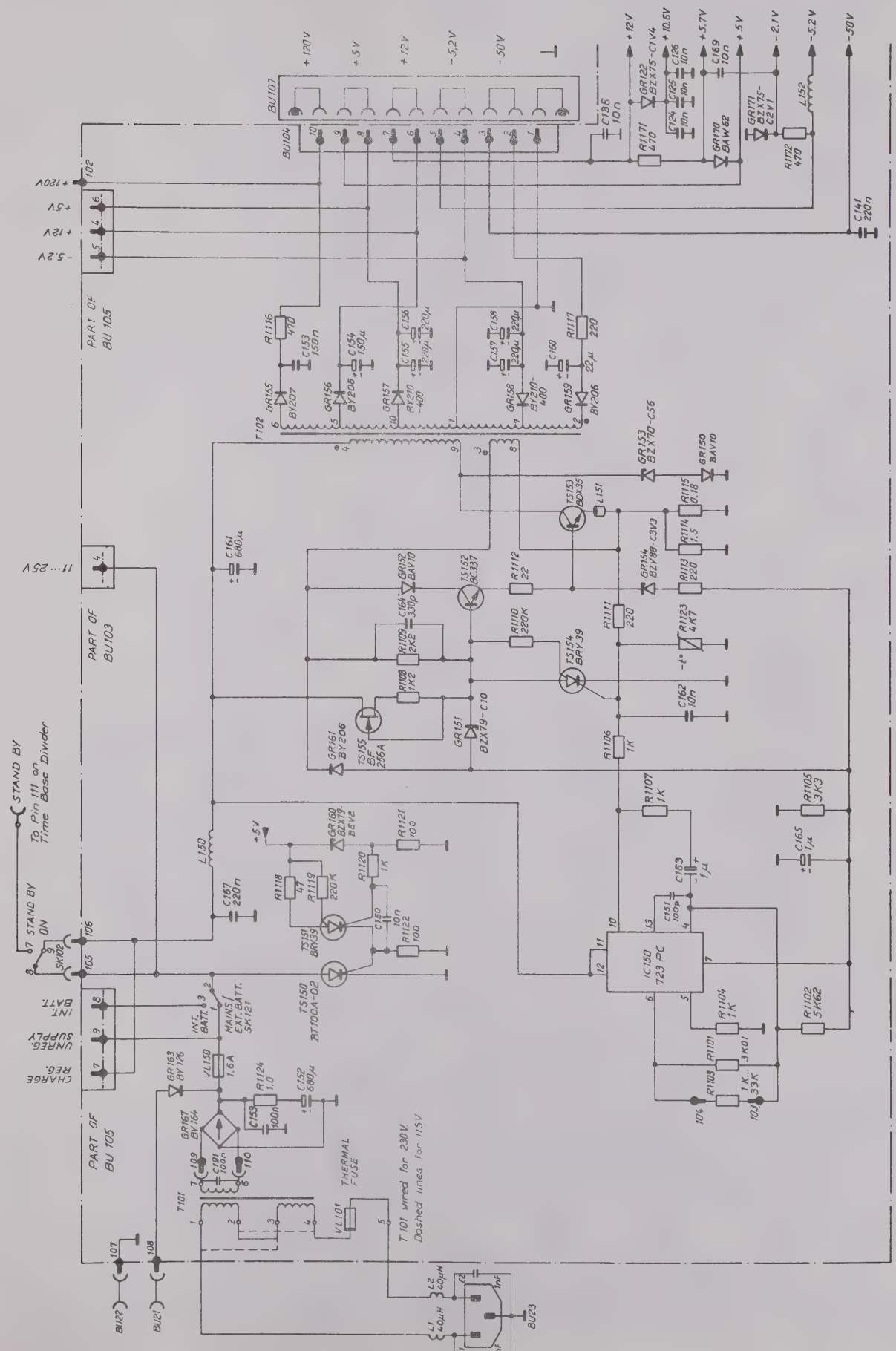
Circuit diagrams for counters: PM 6611 and PM 6613...16

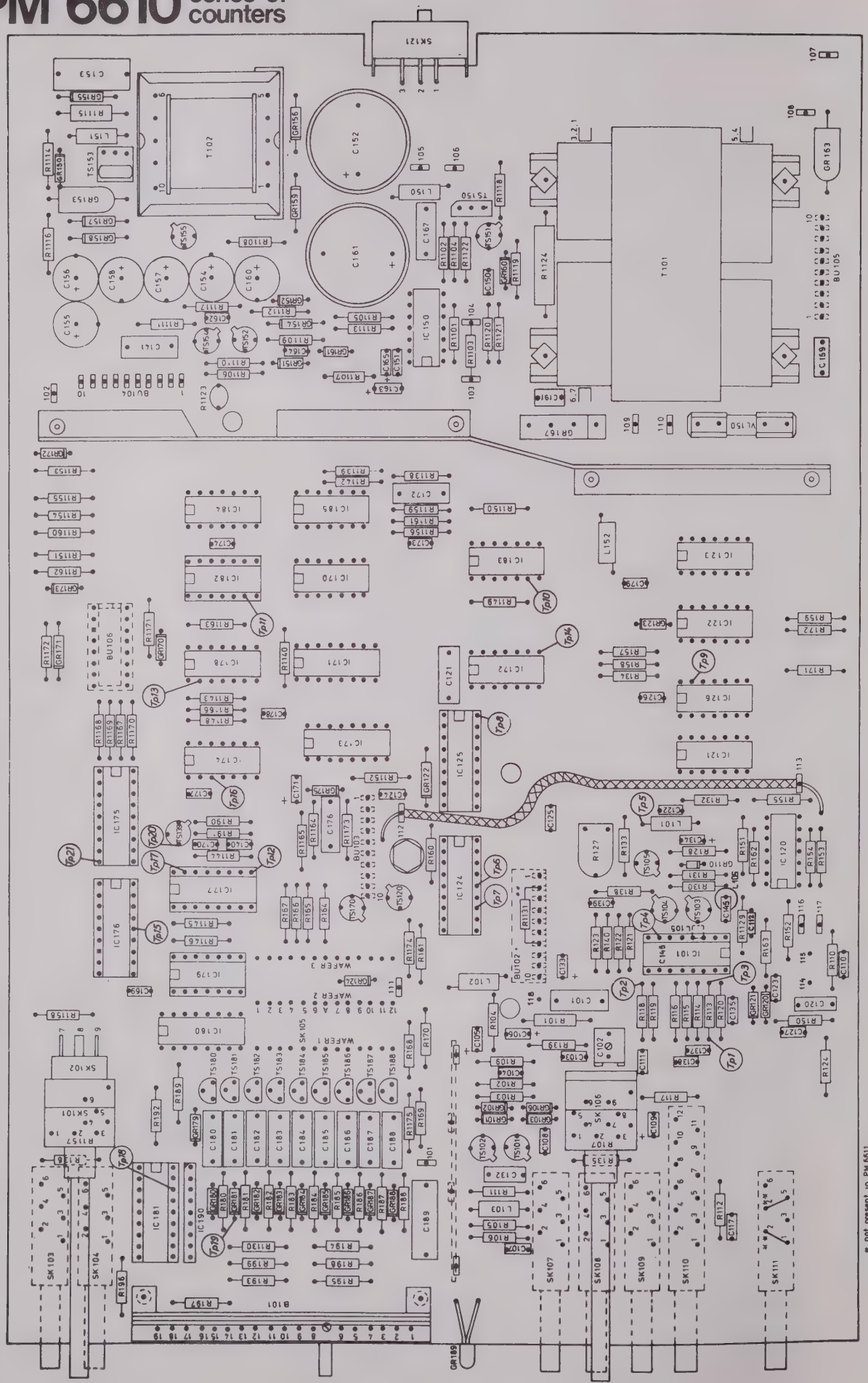


* not present in PM 6611
** not present in PM 6613, PM 6614 and PM 6615

Power Supply

for PM 6611 and PM 6613...16

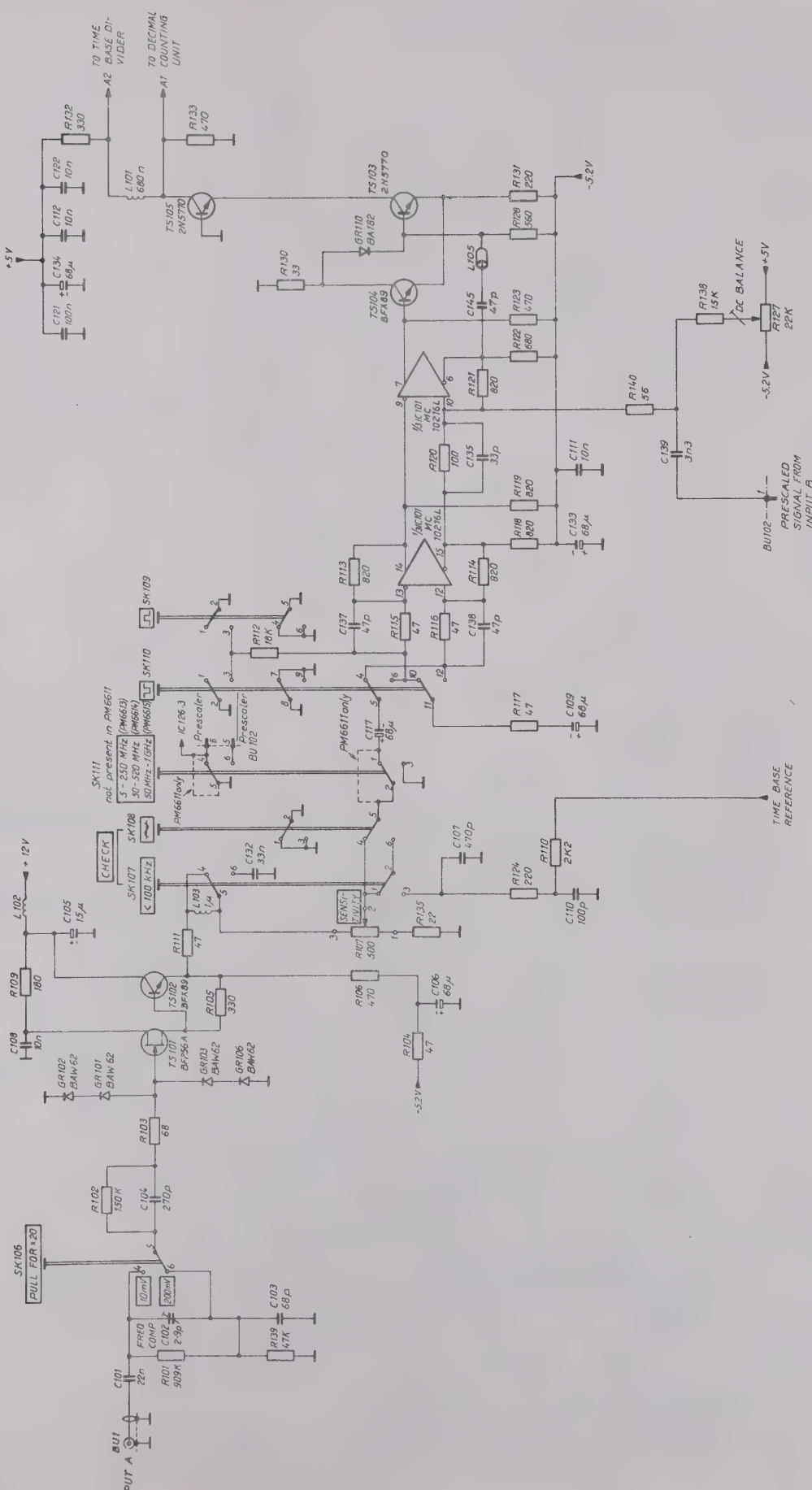


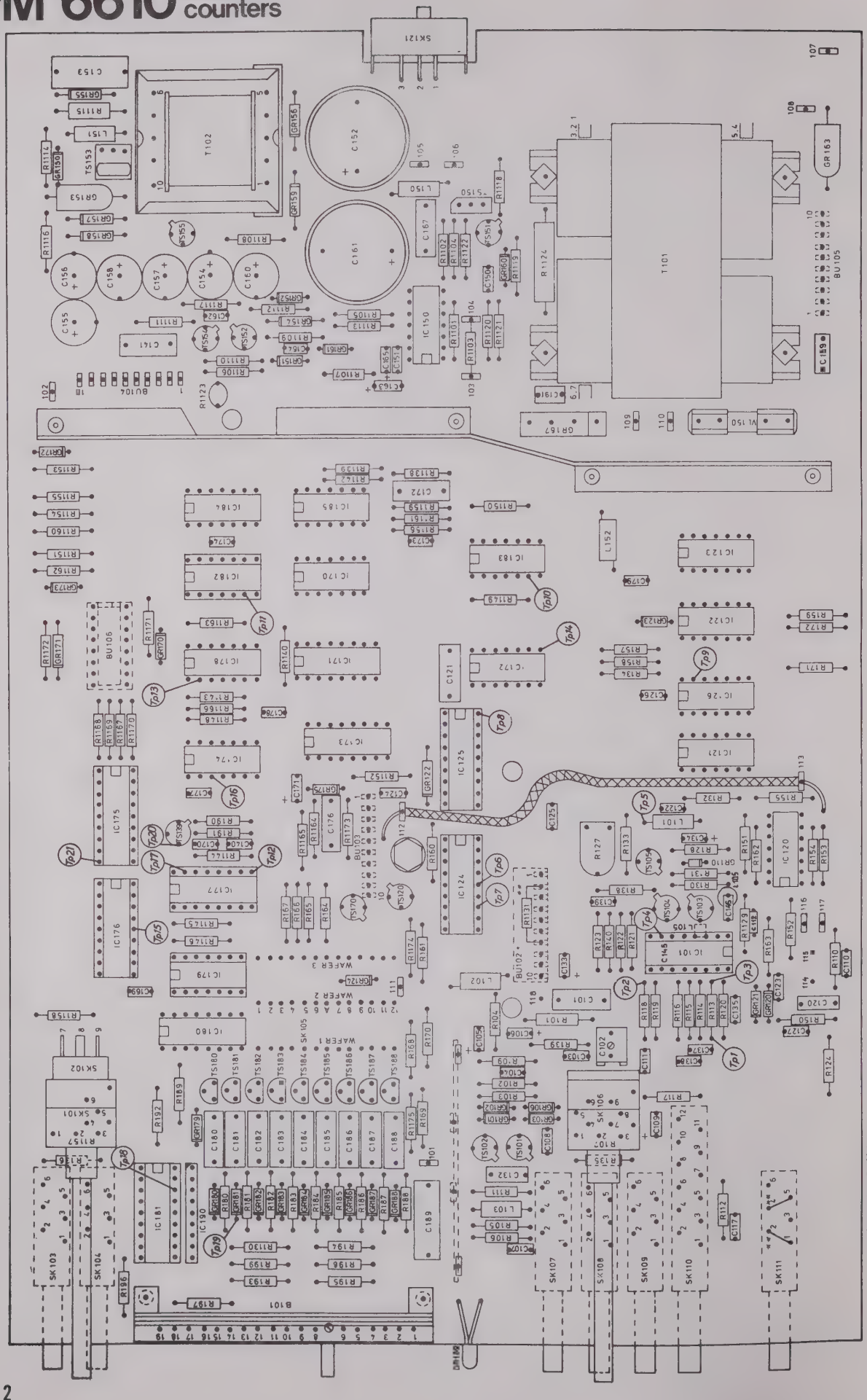


* not present in PM 6611
** not present in PM 6613, PM 6614 and PM 6615

Input Amplifier

for PM 6611 and PM 6613...16

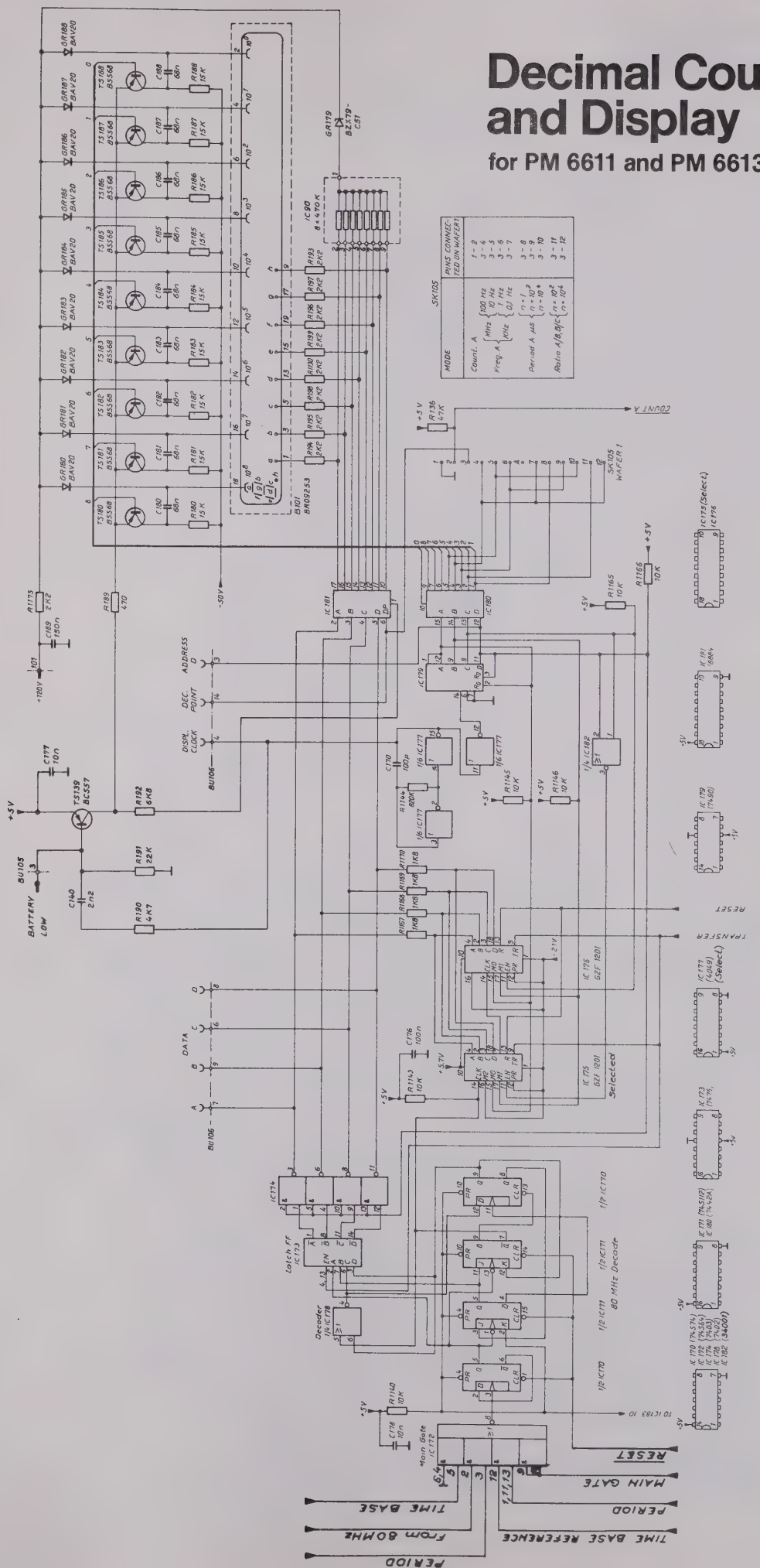


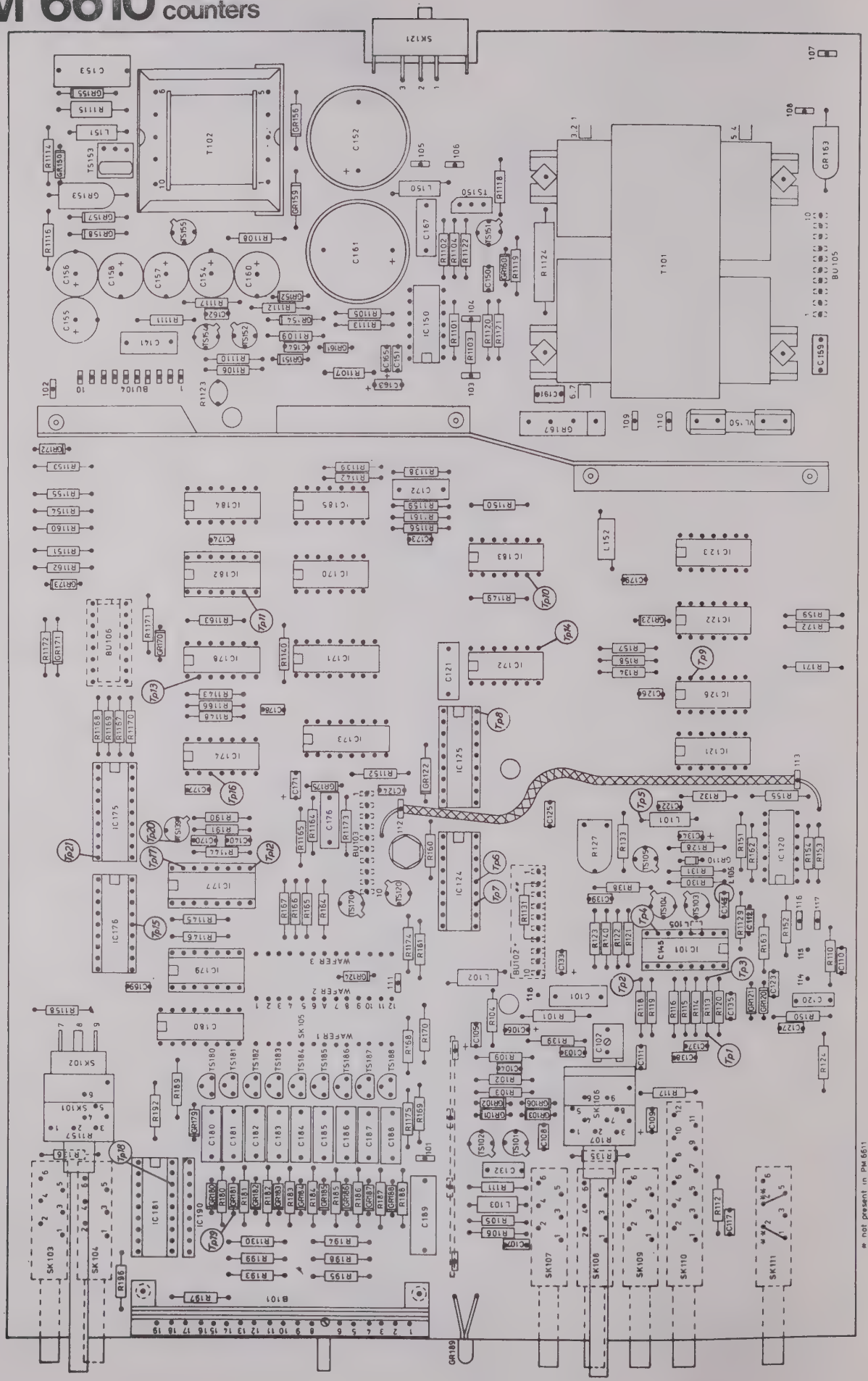


* not present in PM 6611
** not present in PM 6613, PM 6614 and PM 6615

Decimal Counting Unit and Display

for PM 6611 and PM 6613...16

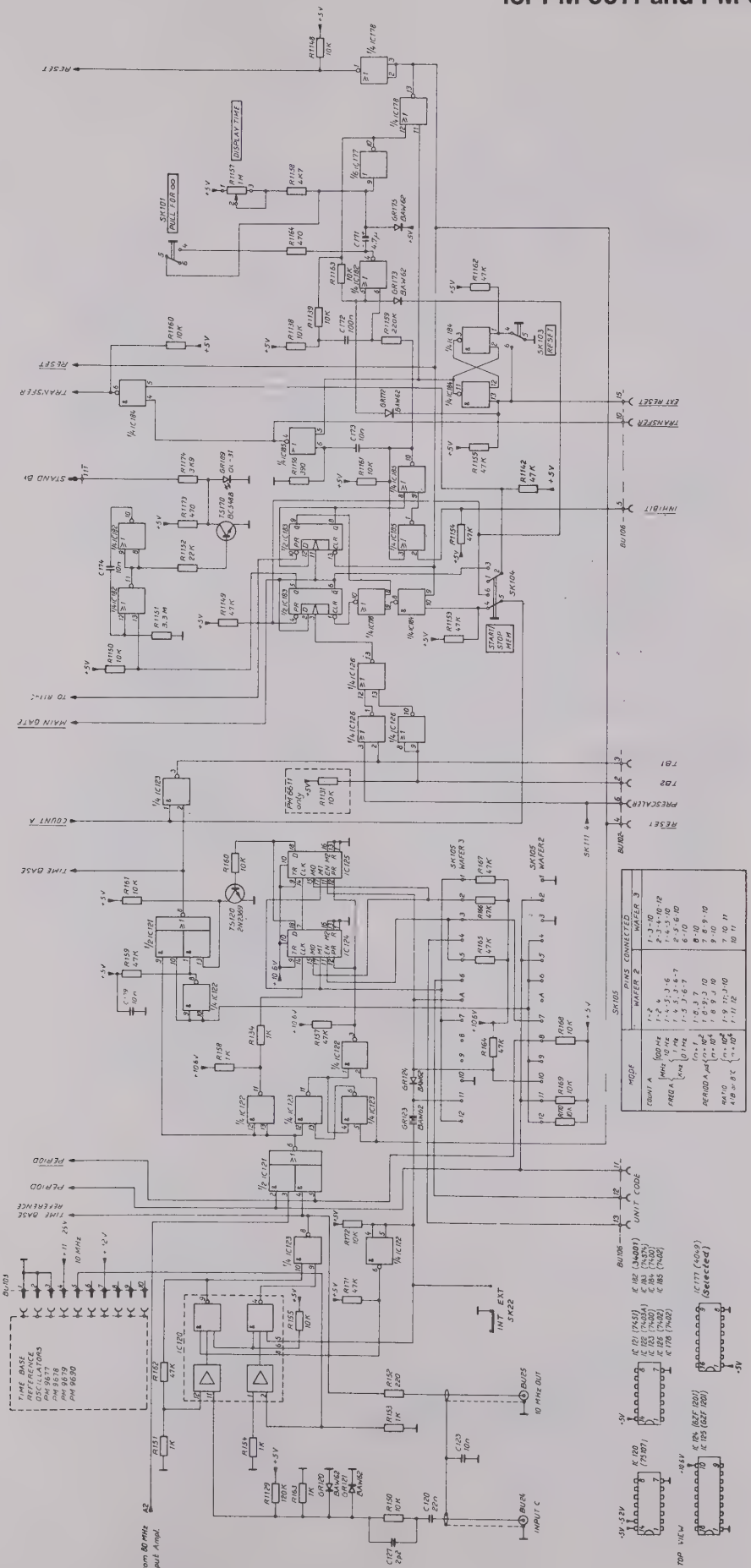


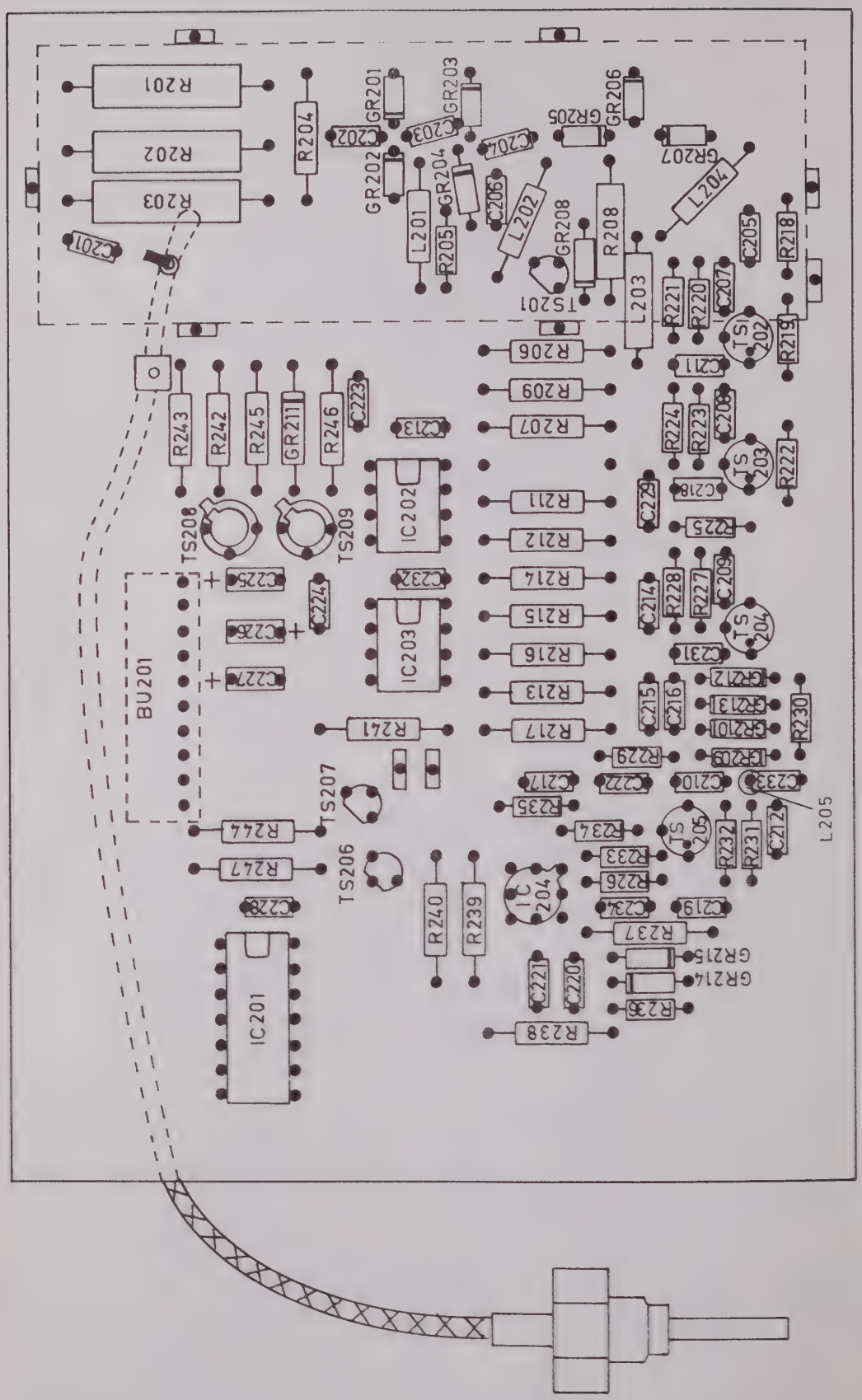


* not present in PM 6611
** not present in PM 6613, PM 6614 and PM 6615

Time Base Divider

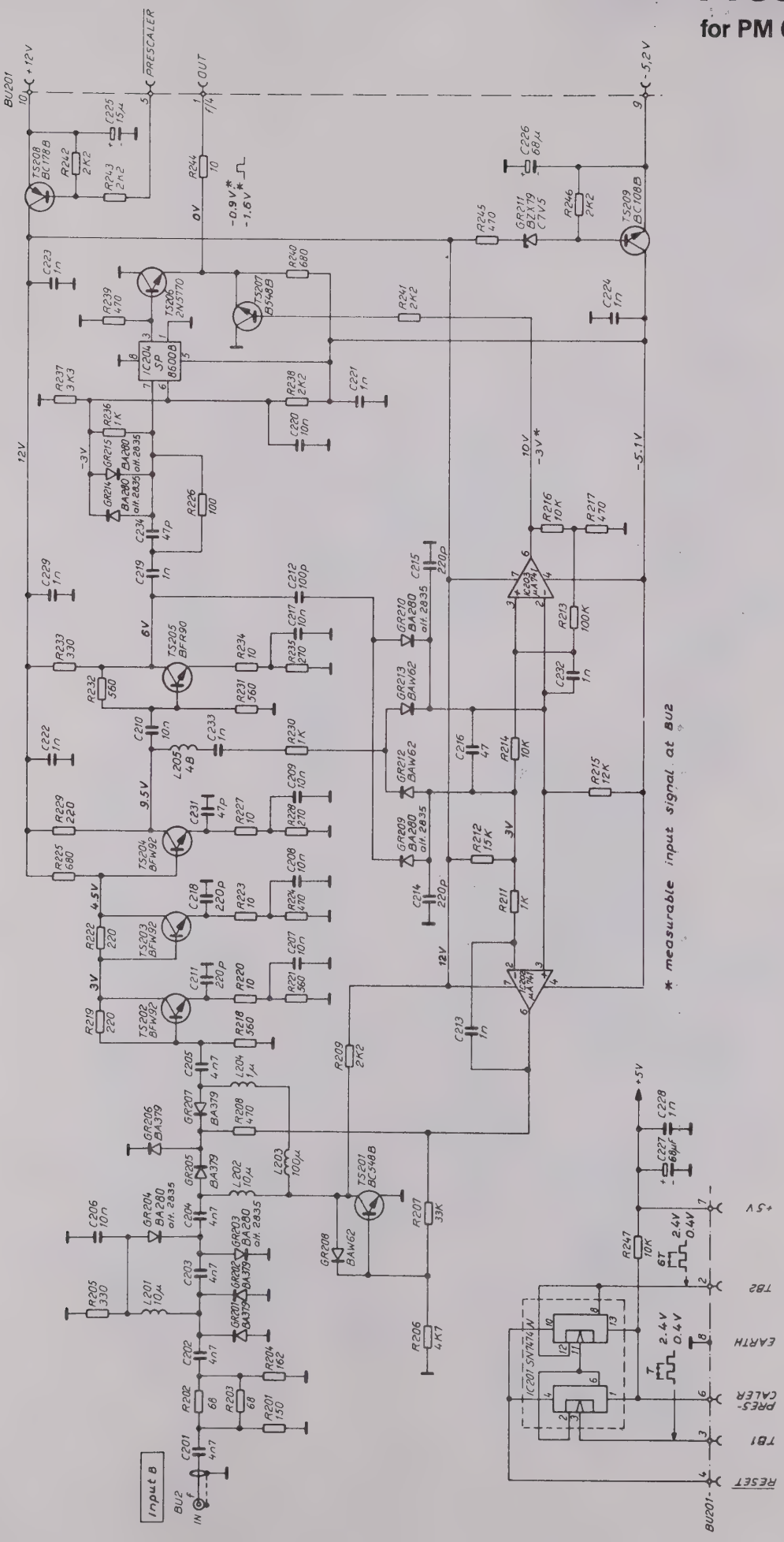
for PM 6611 and PM 6613...16

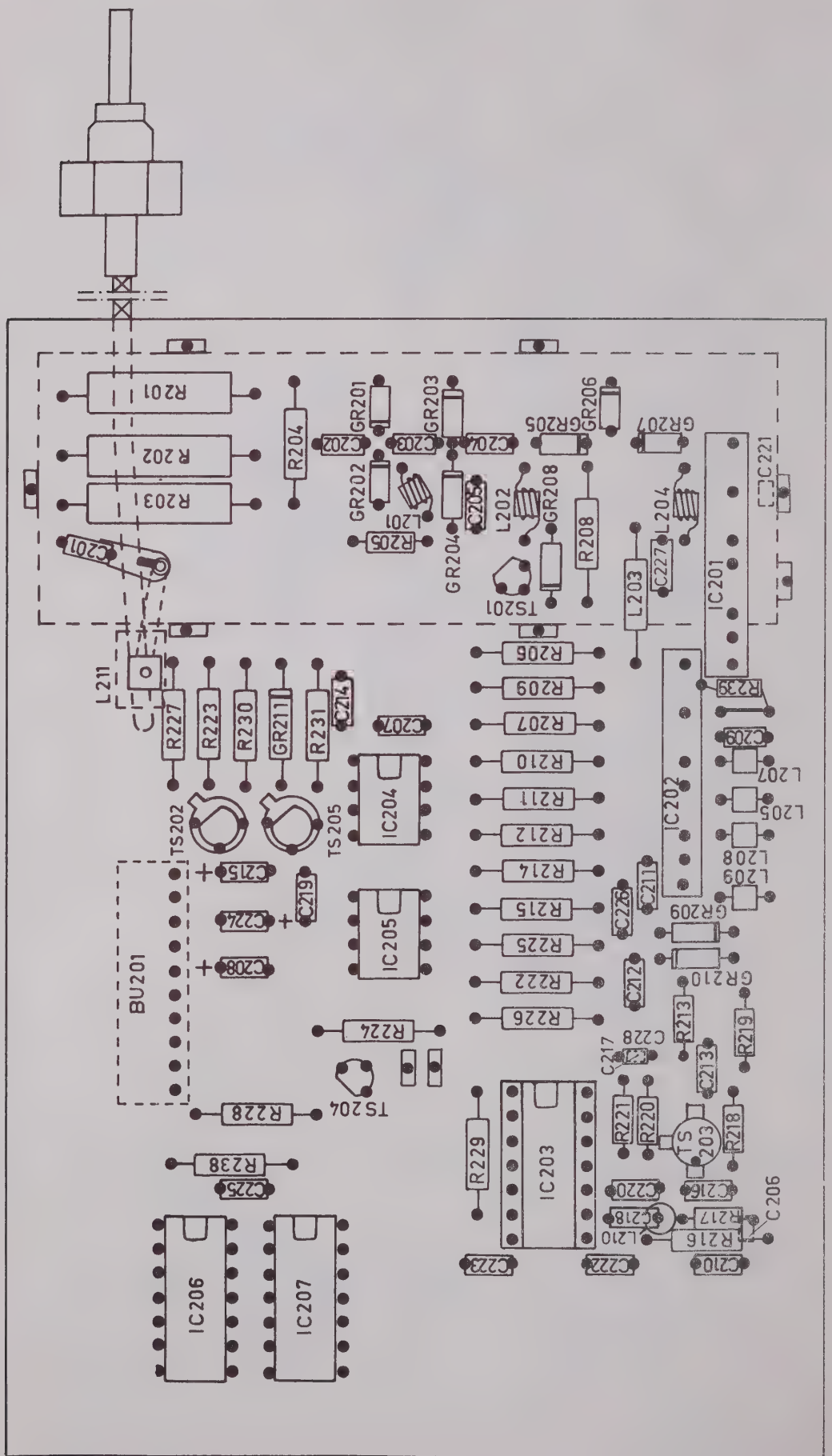



R201
R202
R203
C201
R204
GR201
C202
C203
GR203
C204
GR205
GR206
GR207
L204
GR202
L201
R205
GR204
C206
L202
GR208
R208
L203
TS201
R206
R209
R207
R211
R212
R214
R215
R216
R213
R217
R241
R229
C217
R235
R234
R233
R226
C234
R237
GR215
GR214
R238
C221
C220
R240
R239
IC204
IC201
R244
R247
C228
TS206
TS207
BU201
C225
C226
C227
C224
TS208
TS209
IC202
IC203
C232
C213
R243
R242
R245
GR211
R246
C223
R221
R220
C207
C205
R218
R219
TS202
C211
R224
R223
C208
R222
TS203
C218
C229
C225
C214
R228
R227
C209
TS204
C231
GR212
GR213
GR210
GR208
C215
C216
R230
C233
C210
C222
R232
R231
C212
TS205
L205

Prescaler

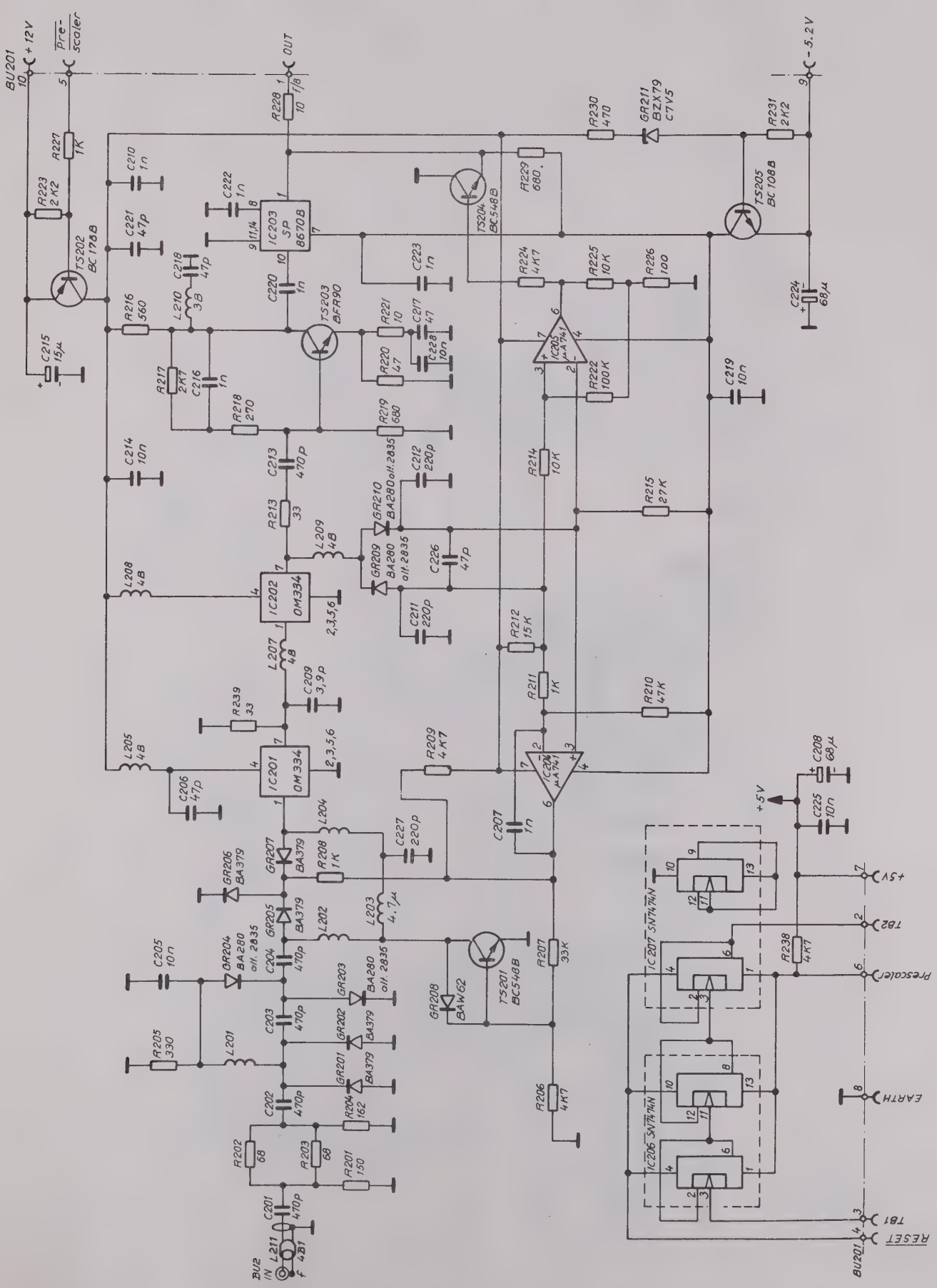
for PM 6613

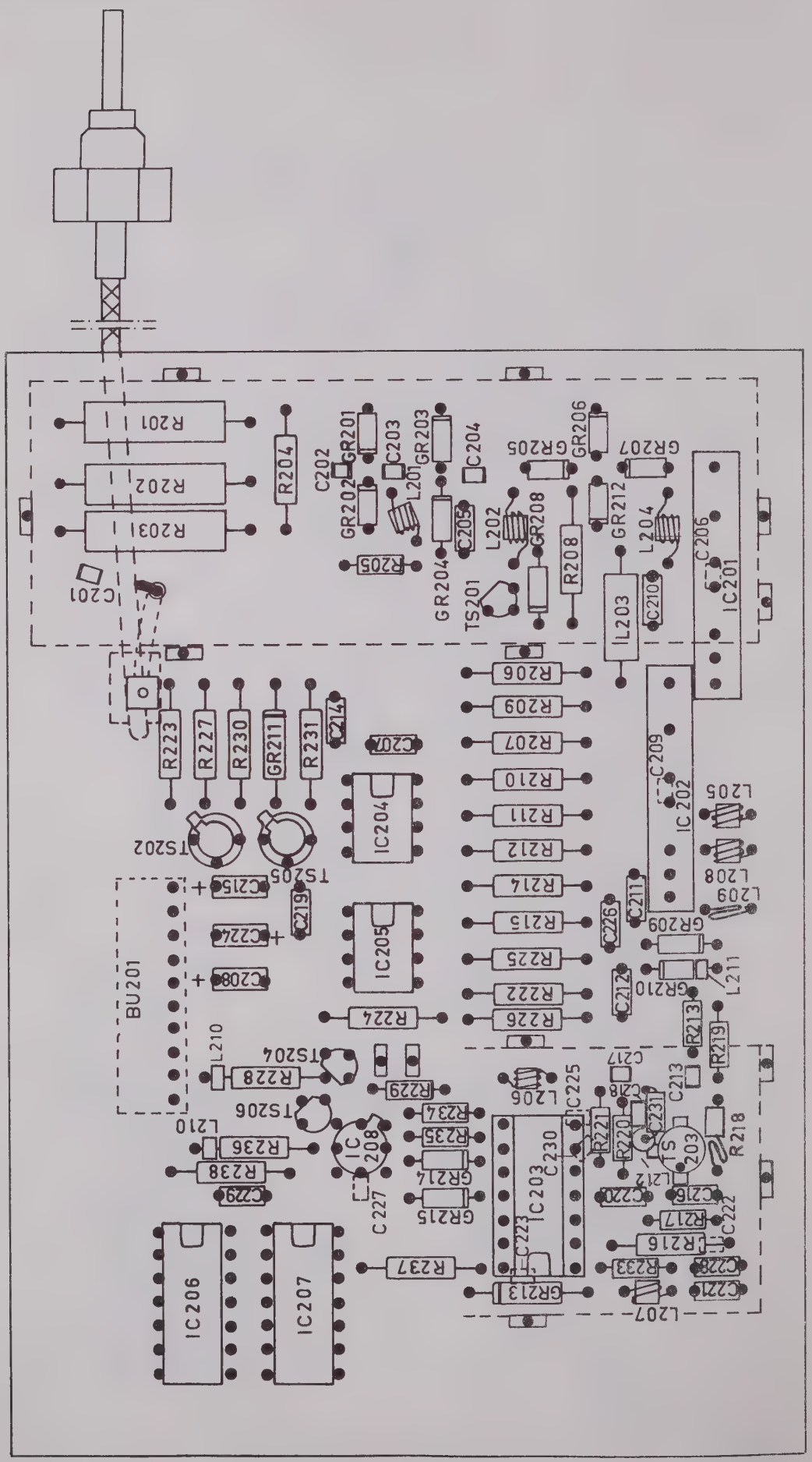



R201
R202
R203
C201
R204
GR201
GR202
GR203
GR204
GR205
GR206
GR207
C202
C203
C204
C205
L201
R205
L202
GR208
R208
TS201
L203
C227
L204
IC201
C221
L211
R227
R223
R230
GR211
R231
C214
C207
TS202
TS205
IC204
IC205
BU201
C215
C224
C208
C219
R224
TS204
R228
R238
C225
IC206
IC207
R206
R209
R207
R210
R211
R212
R214
R215
R225
R222
R226
IC203
R229
IC202
R235
C209
L207
L205
L208
L209
C211
C226
GR209
GR210
C212
R213
R219
C217
C228
C213
R221
R220
TS 203
R218
C220
C216
C218
L210
R217
R216
C206
C223
C222
C210

Prescaler

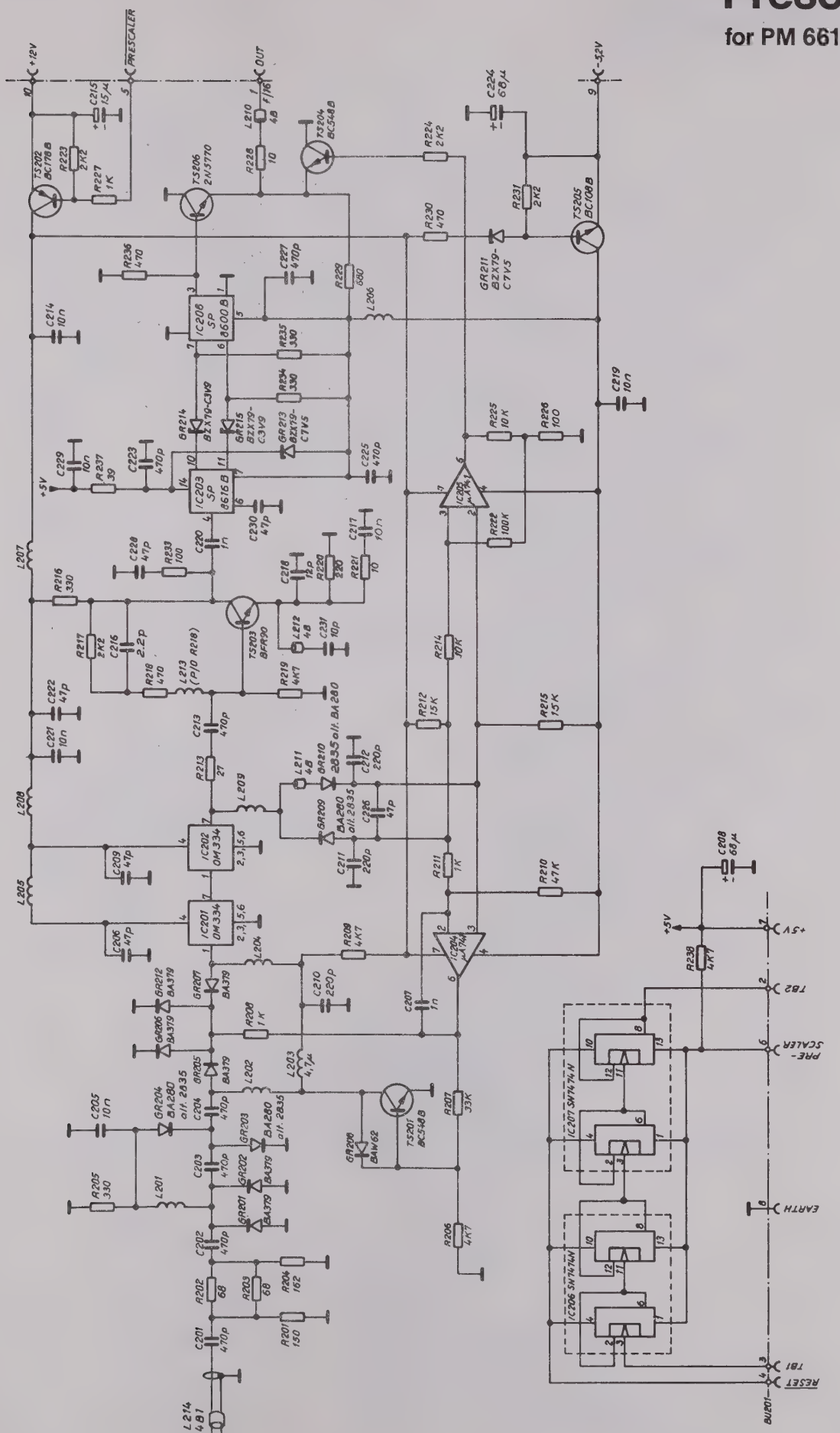
for PM 6614

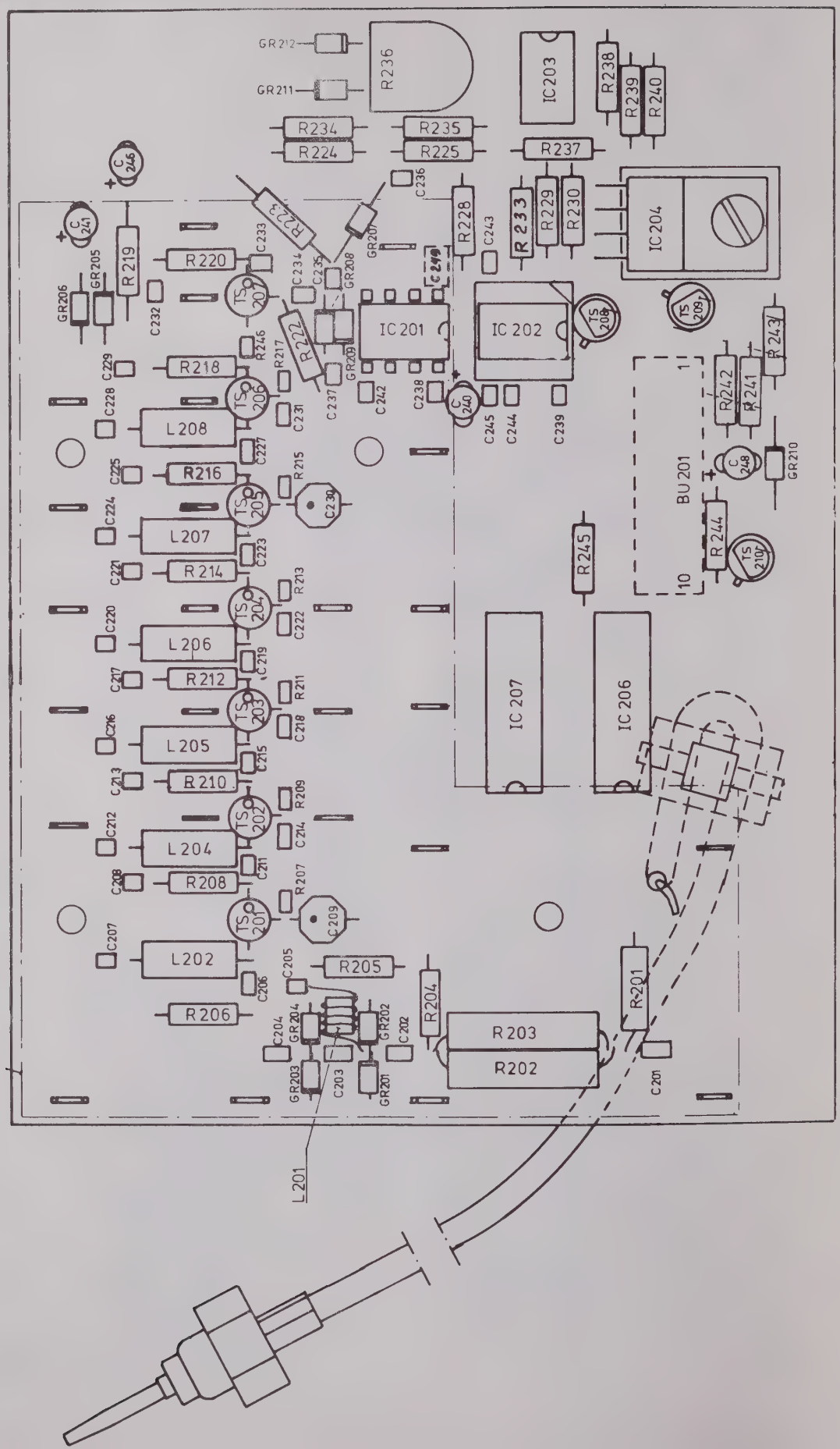



R201
R202
R203
R204
C201
C202
GR201
GR202
C203
L201
GR203
GR204
C204
C205
R205
L202
GR208
TS201
R208
GR205
GR206
GR207
GR212
L204
C206
C210
L203
IC201
R206
R209
R207
R210
R211
R212
R214
R215
R225
R222
R226
C209
IC202
L205
L208
L209
GR209
C211
C226
GR210
C212
L211
R213
R219
C217
C213
R218
C218
C231
TS 203
C212
C220
C216
R217
R216
C222
C228
R233
C221
L207
C223
IC203
C230
C225
R221
R220
L206
R224
R229
R234
R235
GR214
GR215
C227
IC 208
R237
GR213
IC206
IC207
BU201
L210
TS204
R228
TS206
R236
R238
C229
TS202
TS205
C214
C207
IC204
IC205
C215
C219
C224
C208
R223
R227
R230
GR211
R231

Prescaler

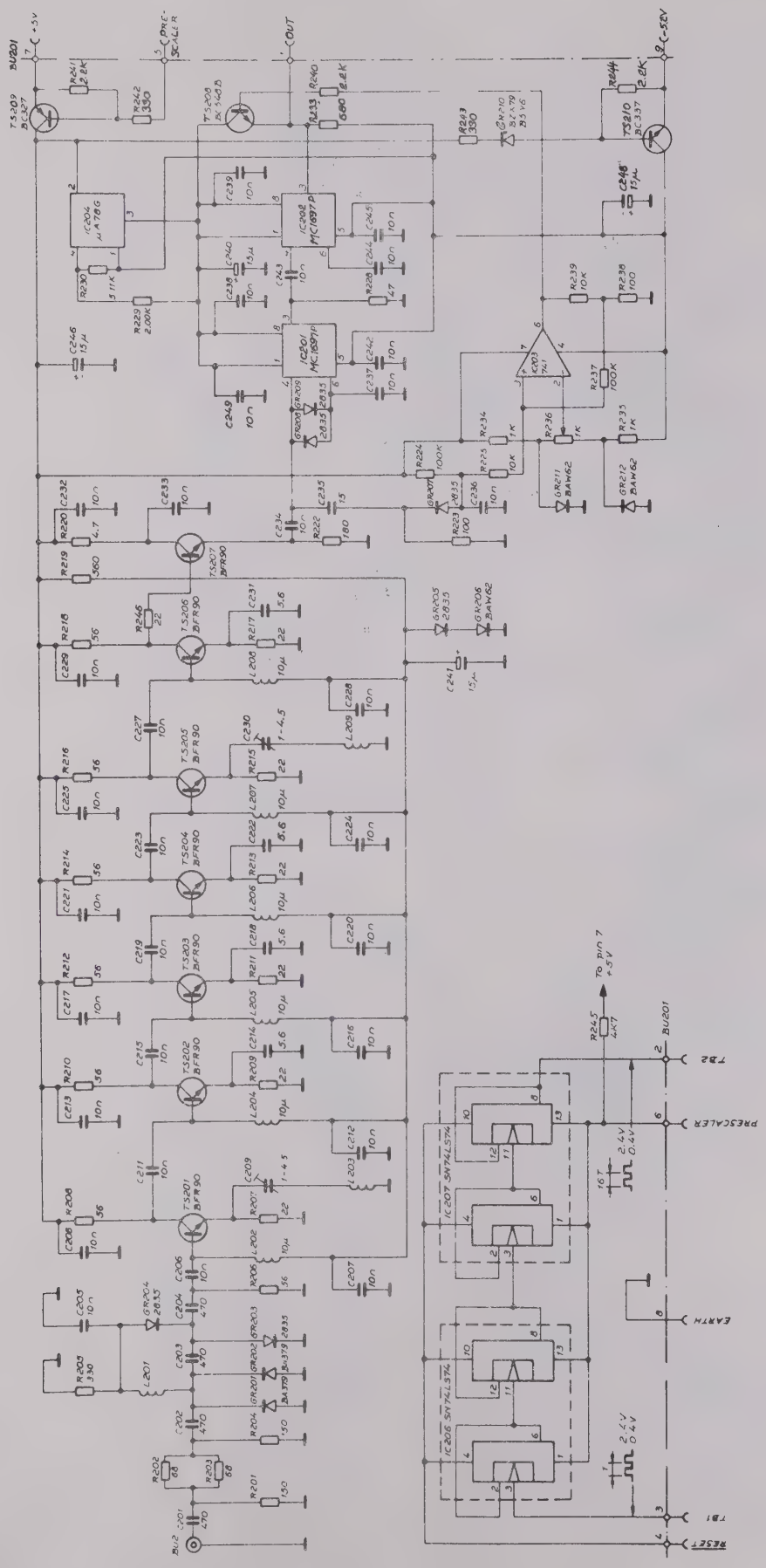
for PM 6615

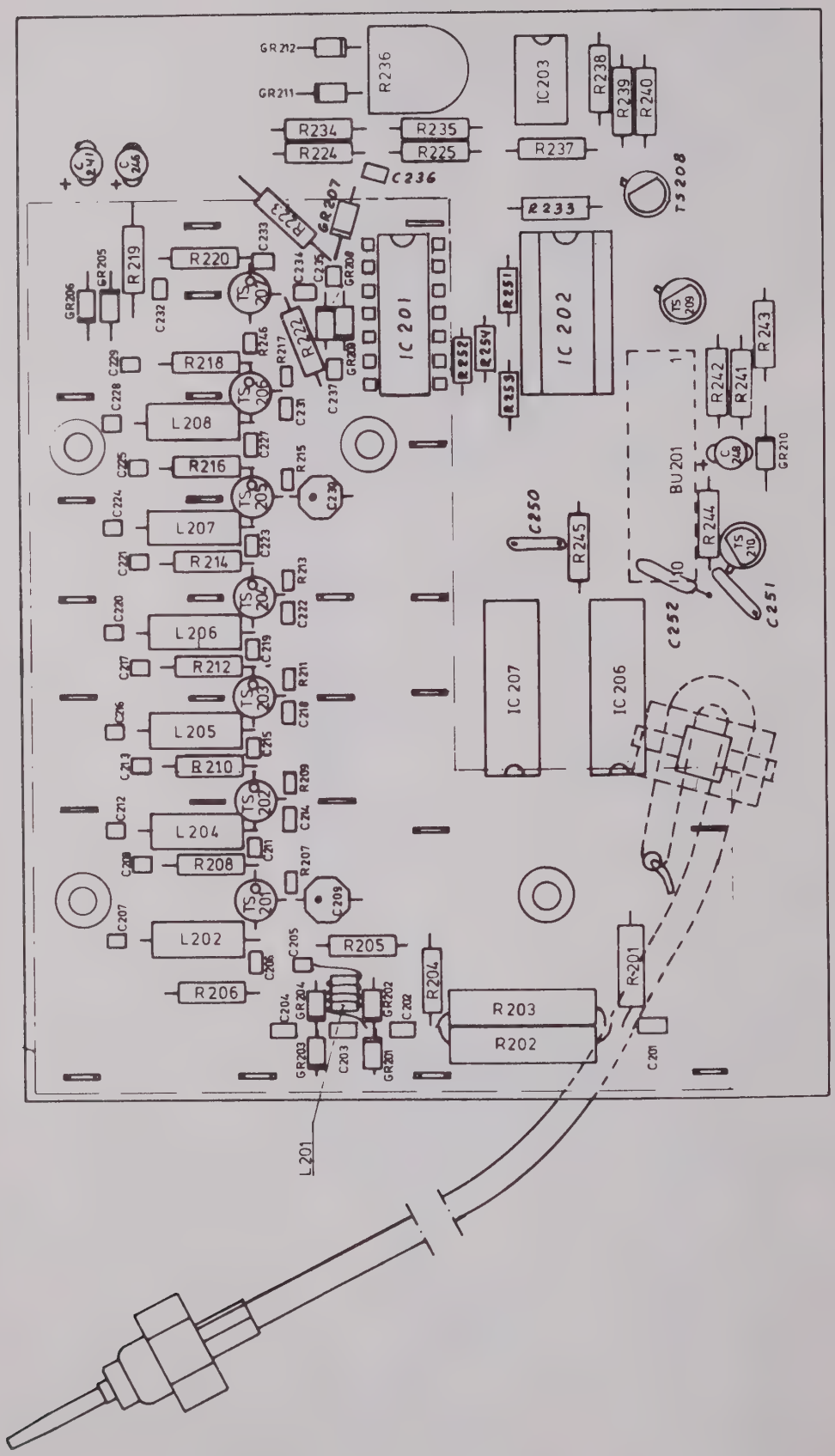



GR212
GR211
R236
IC 203
R238
R239
R240
R234
R224
R235
R225
R237
C236
C246
C241
R219
R220
C233
R223
GR207
R228
C243
R233
R229
R230
IC 204
GR206
GR205
C232
C234
C235
GR208
IC 201
IC 202
TS 209
TS 208
R243
R218
R246
R217
R222
GR209
C229
C228
C242
C238
C240
C245
C244
C239
R242
R241
L208
C227
R216
C225
R215
C230
C248
GR210
BU 201
TS 205
C224
L207
C223
R214
C221
R213
R245
TS 210
R244
TS 204
C220
L206
C222
C219
R212
C217
R211
IC 207
IC 206
TS 203
C216
L205
C218
C215
R210
C213
R209
TS 202
C212
L204
C214
C211
R208
C208
R207
TS 201
C209
C207
L202
C205
R205
R204
R201
C206
R206
C204
GR204
GR202
R203
R202
C202
GR203
C203
GR201
C201
L201

Prescaler

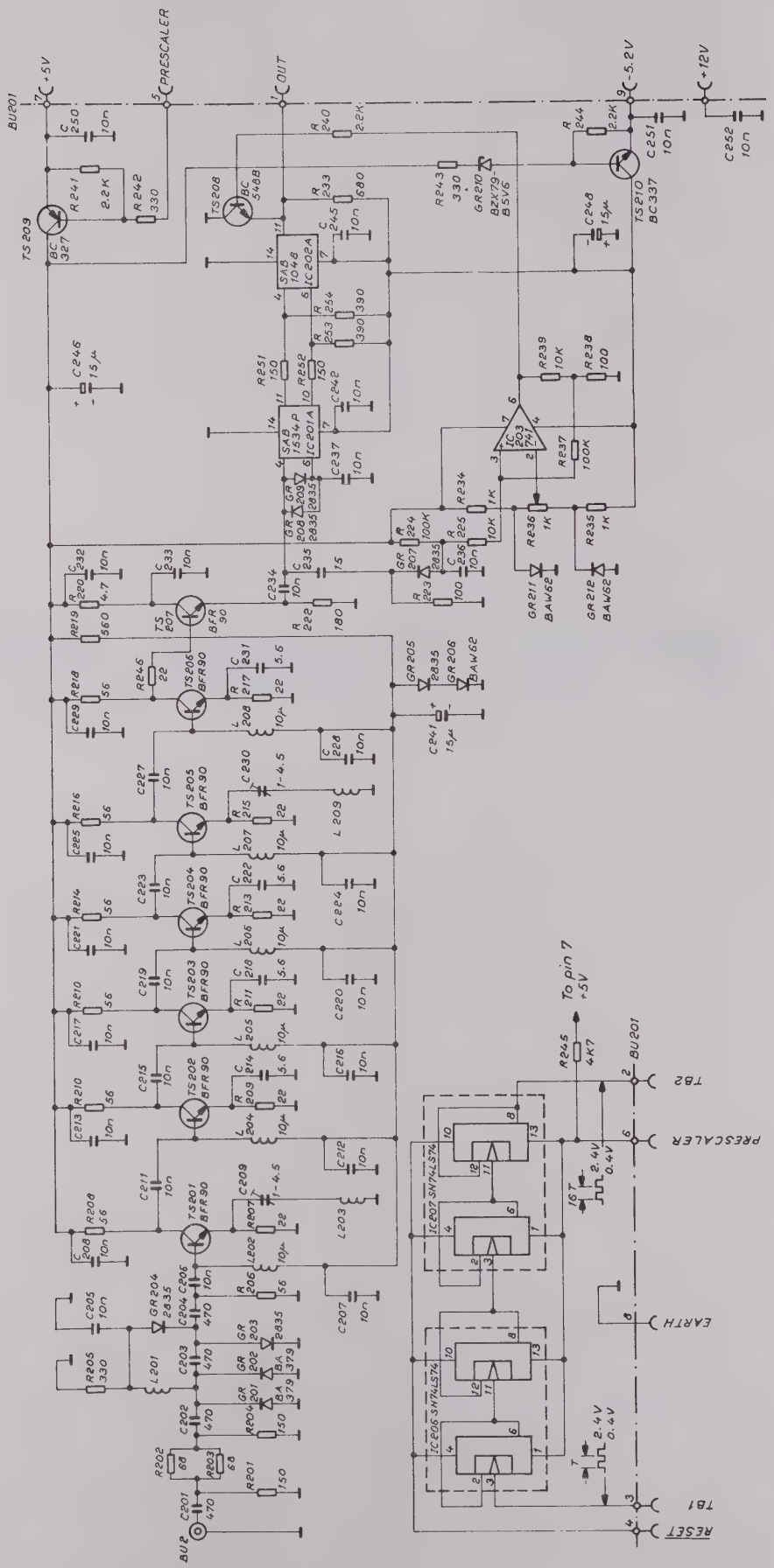
for PM 6616 Version 1




GR212
GR211
R236
IC203
R238
R239
R240
R234
R224
R235
R225
R237
C236
R233
TS208
R223
GR207
R220
R219
GR205
GR206
C233
C234
C235
GR208
IC 201
IC 202
R251
R252
R254
R253
TS209
R242
R241
R243
R218
R222
R217
R246
GR209
C237
C232
C229
C228
C231
L208
R216
R215
C230
C227
C225
C224
L207
R214
C223
C221
R213
C222
C220
L206
R212
C219
C217
R211
C218
C216
L205
R210
C215
C213
R209
C214
L204
R208
C211
C212
C210
R207
C209
C207
L202
R206
C205
C206
R205
R204
C204
GR204
GR202
C202
R203
R202
GR203
GR201
C203
C201
R201
L201
C250
R245
IC 207
IC 206
BU 201
R244
TS210
C252
C251
GR210

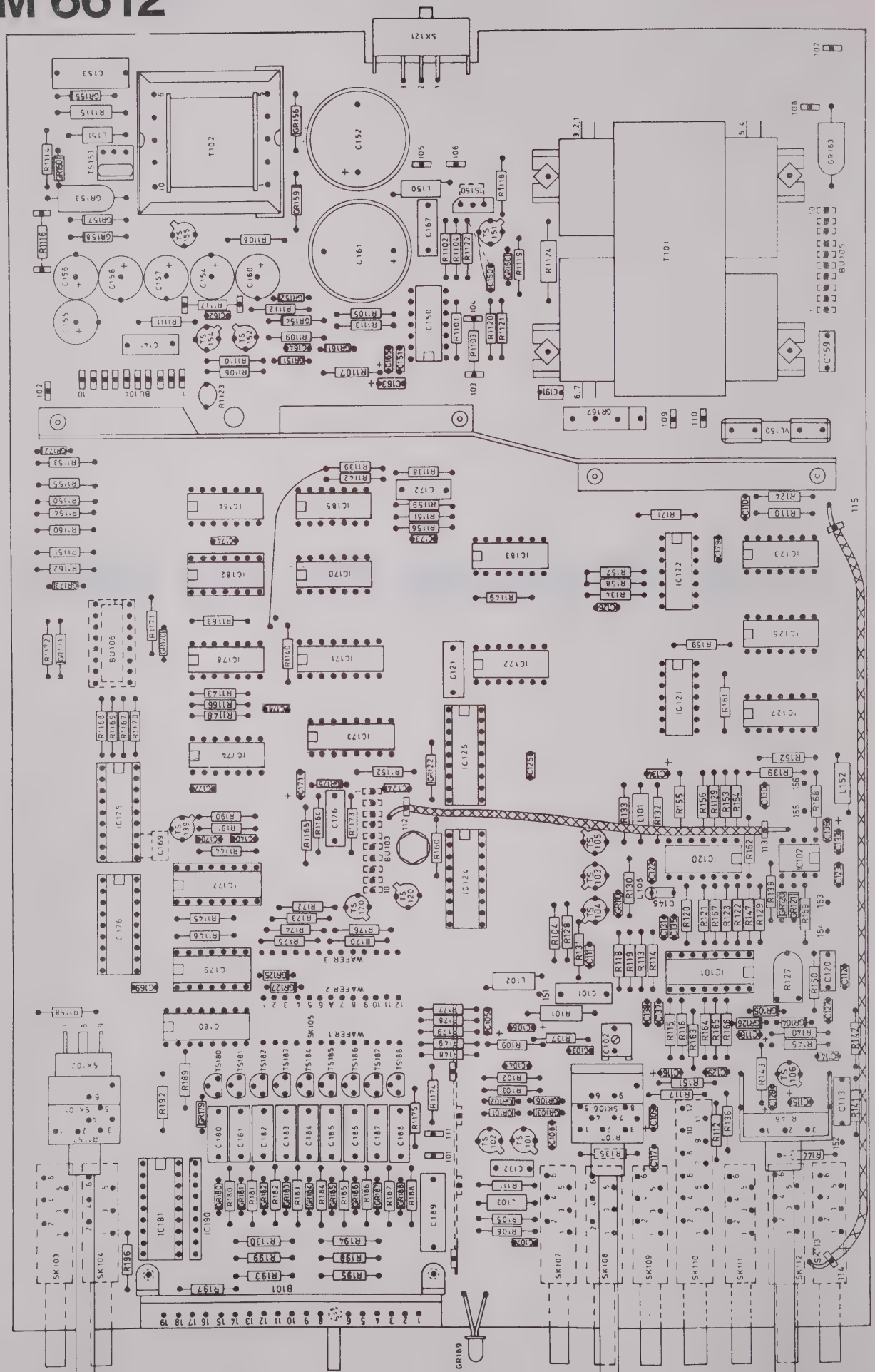
Prescaler

for PM 6616 Version 2



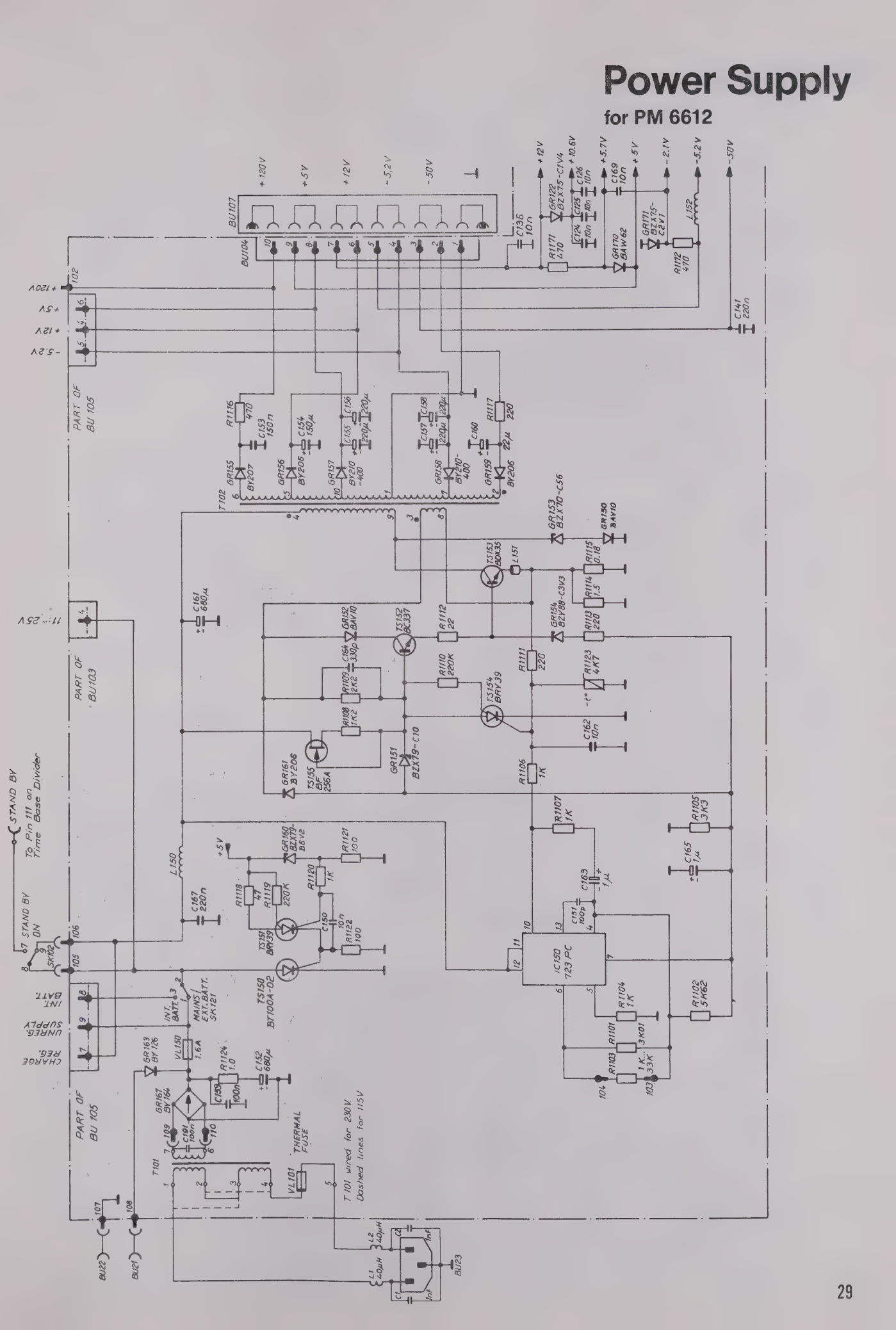
Circuit diagrams for PM 6612

PM 6612

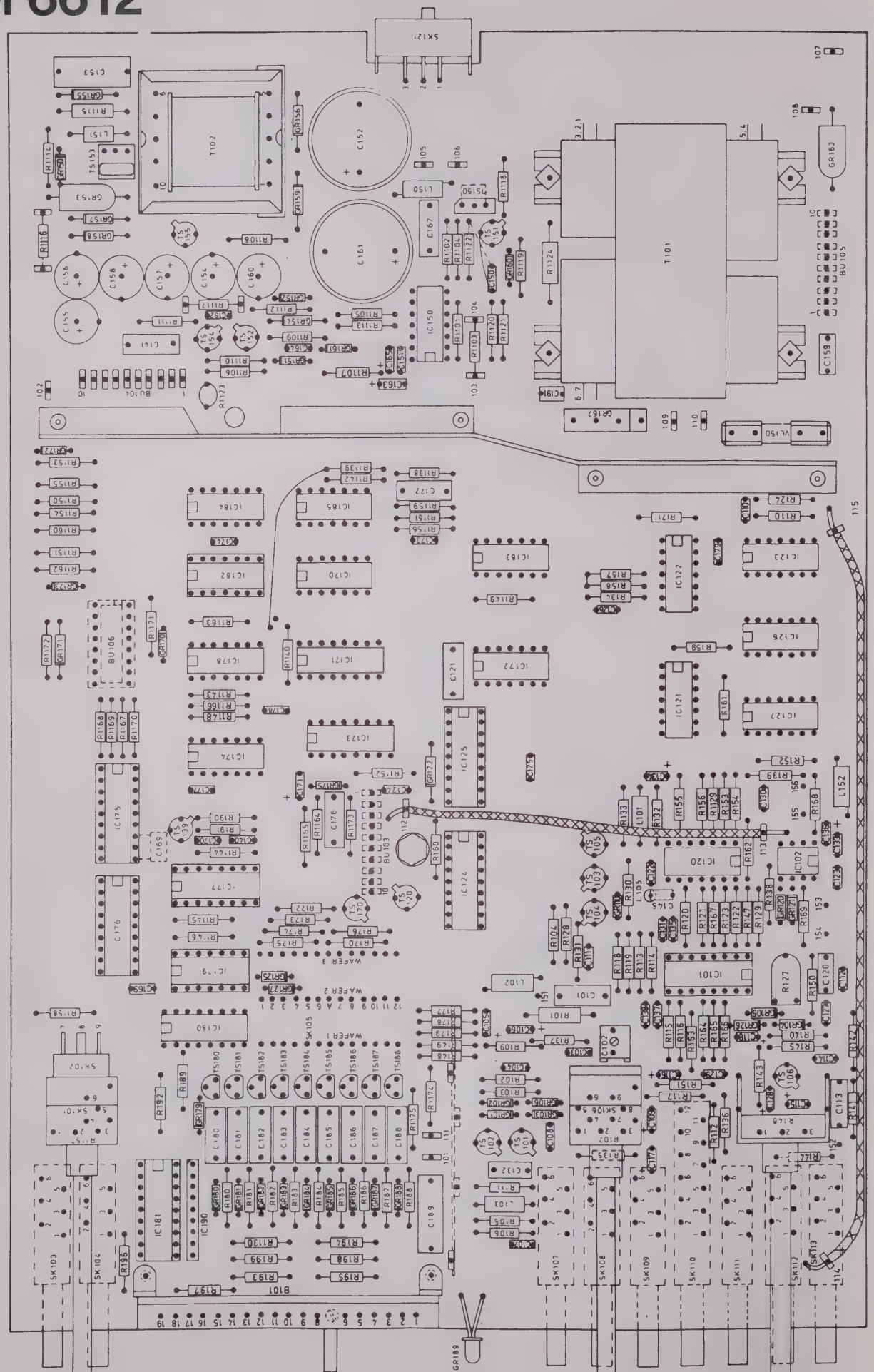


Power Supply

for PM 6612

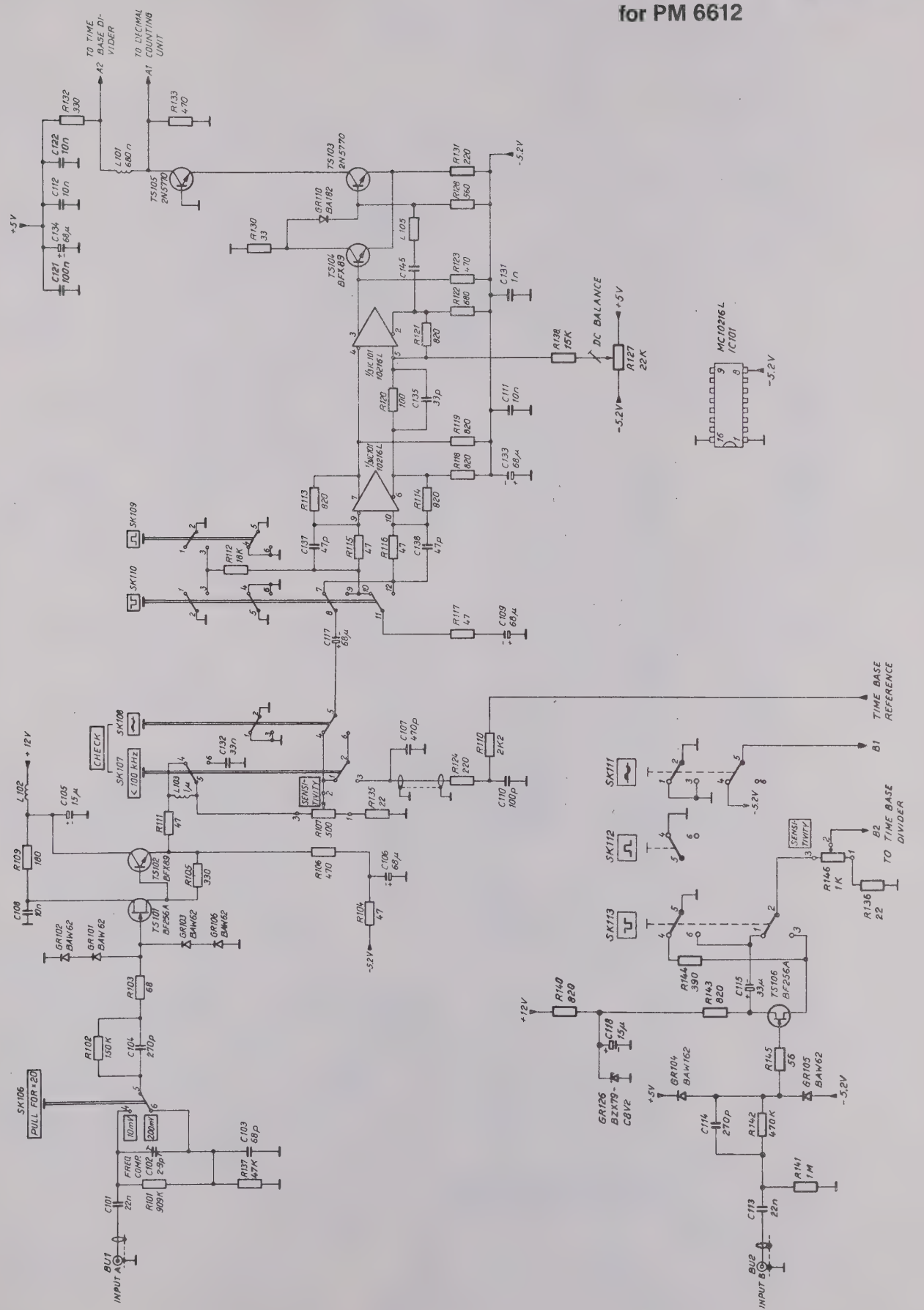


PM 6612

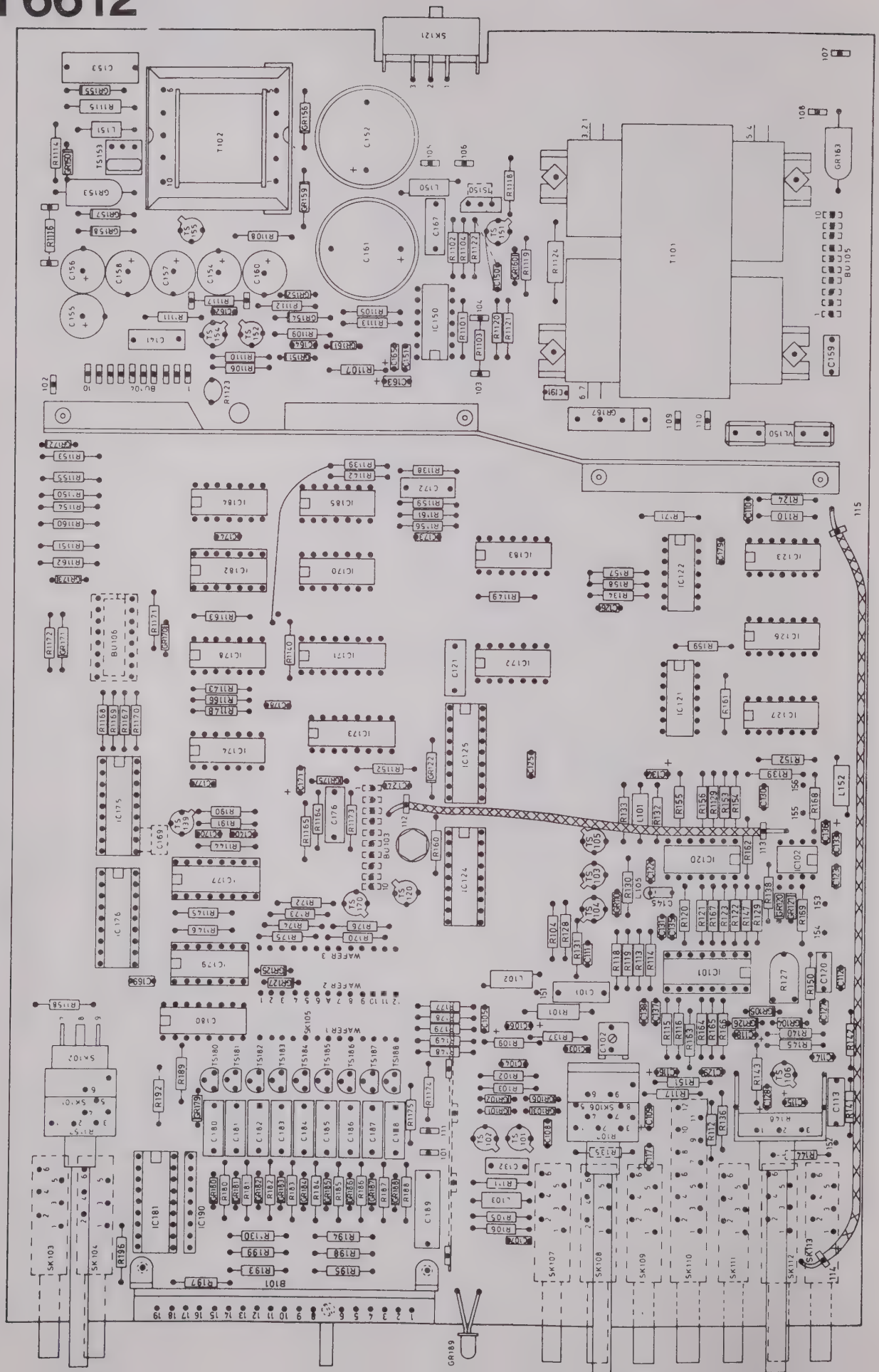


Input Amplifier

for PM 6612

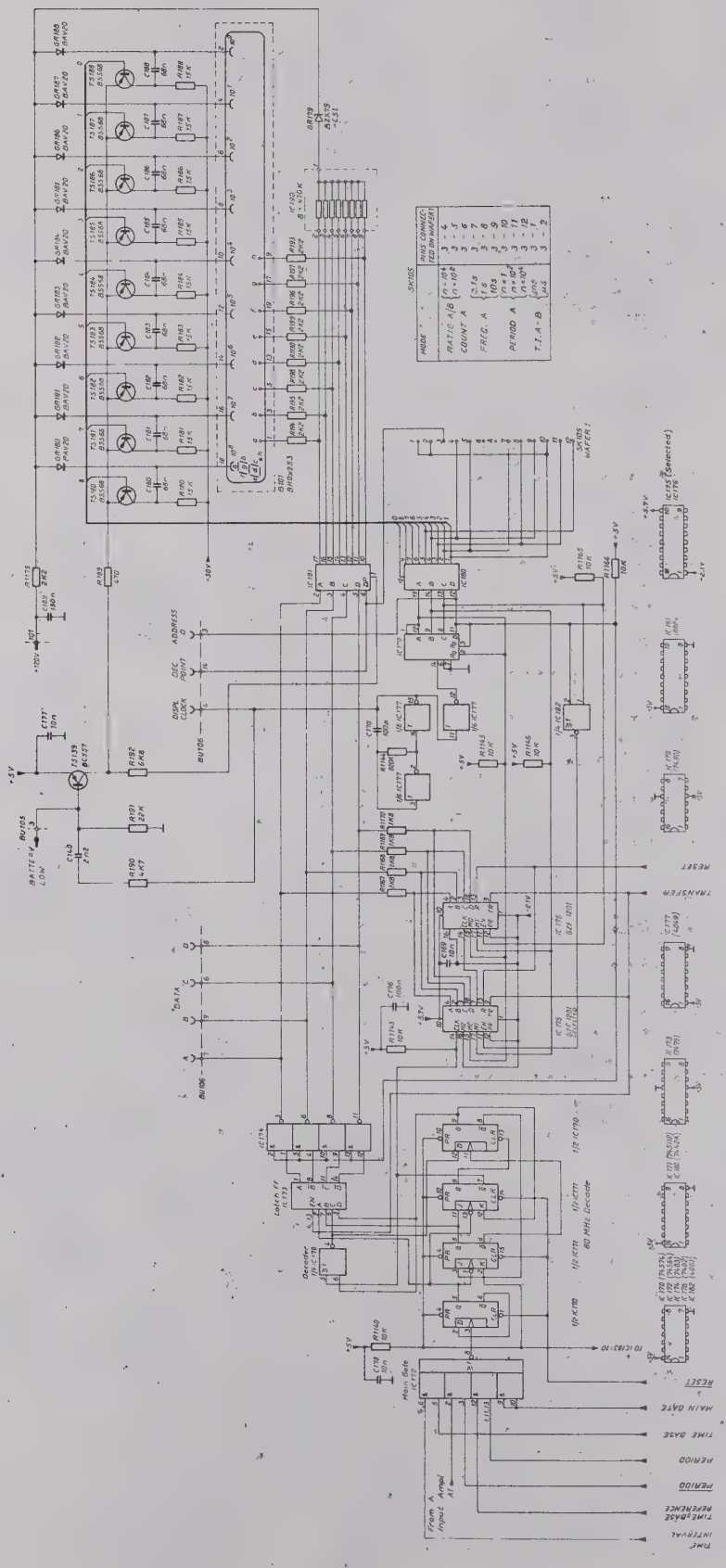


PM 6612

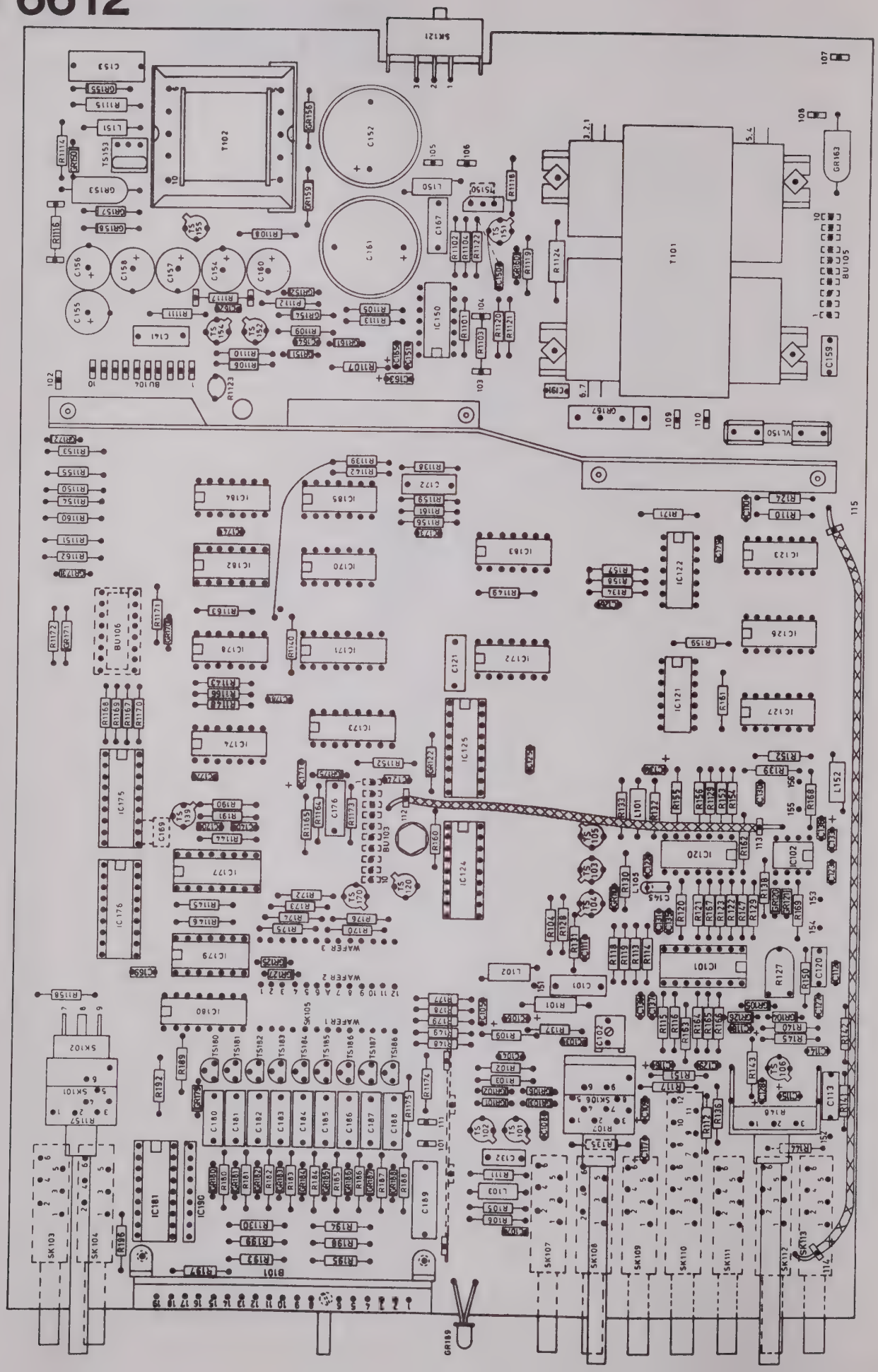


Decimal Counting Unit and Display

for PM 6612

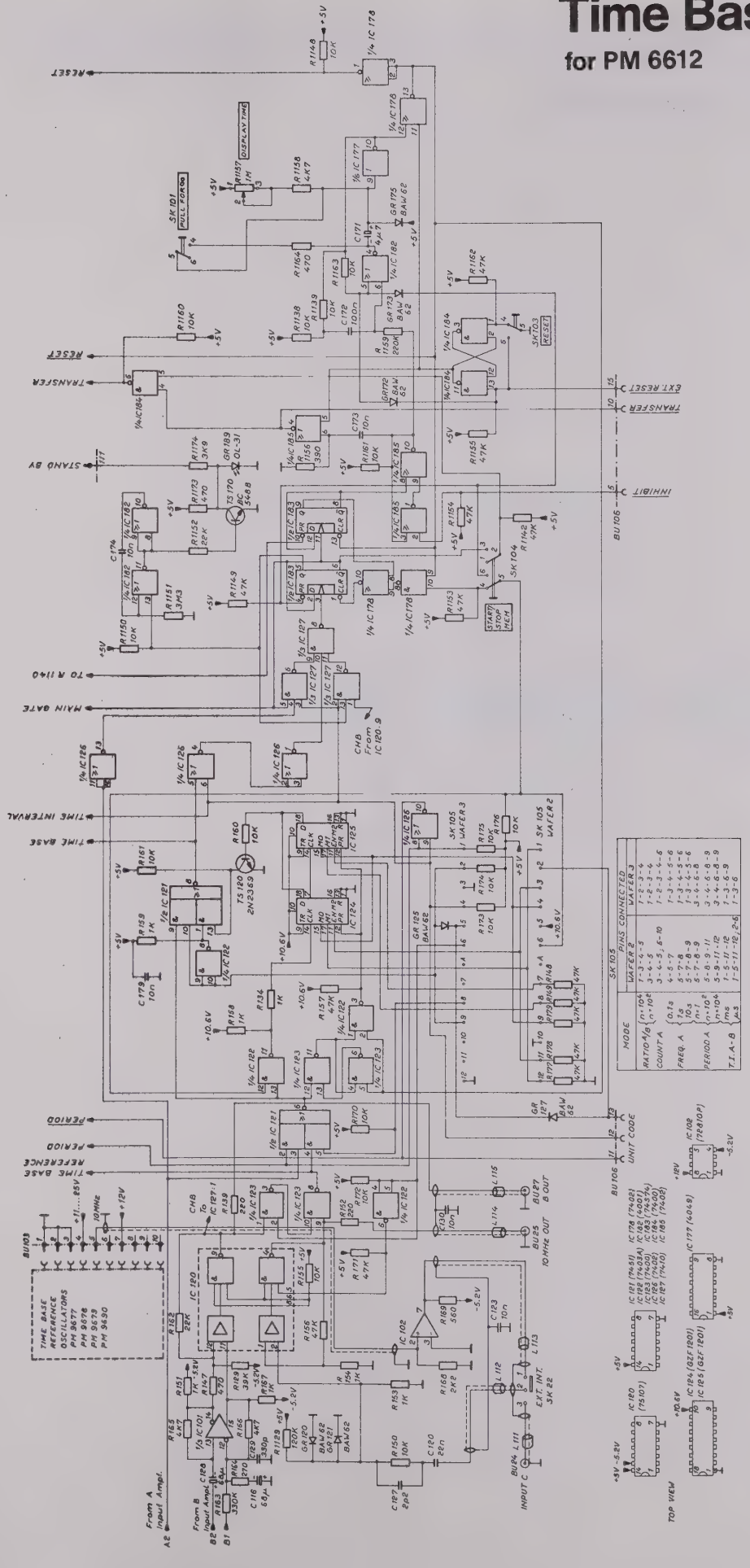


PM 6612



Time Base Divider

for PM 6612



Supply centre for pulse generators and counters

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Telephone: 758-10000

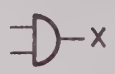
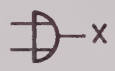
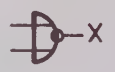
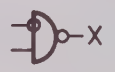
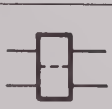
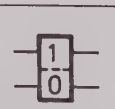
Cable: INDUSTRIPHILIPS

Telex number: 11505 peab s

Telex routing indicator: xssh

PM 6620 series of counters

Standard symbols for logic elements

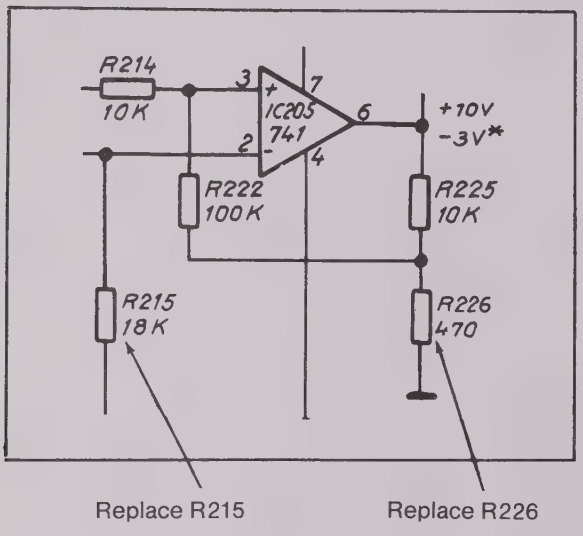
Circuit	I.E.C.	DIN norm 40700	American standard	Boolean function
AND				$X = AB$
OR				$X = A + B$
NAND				$X = \overline{AB}$
NOR				$X = \overline{A+B}$
NAND with one inverting input				$X = \overline{\overline{A}B}$
NOR with one inverting input				$X = \overline{\overline{A}+B}$
INHIBIT GATE				$X = (A+B)\overline{C}$
EXCLUSIVE OR				$X = A\overline{B} + \overline{A}B$
COM-PARATOR				$X = AB + \overline{A}\overline{B}$
Distributed AND				
Distributed OR				
DELAY				
FLIP-FLOP				

Prescaler PM 6624

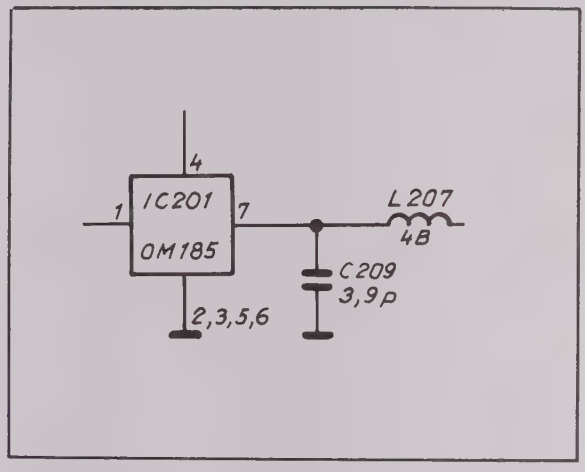
Improving the sensitivity

Trouble symptom: the sensitivity has a dip in the frequency range 300 MHz to 450 MHz.

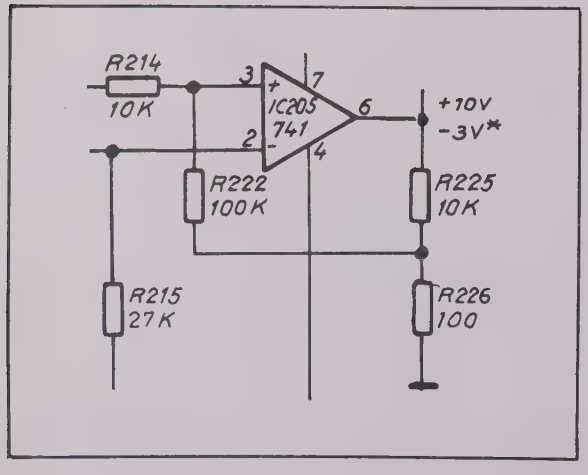
Before



Before

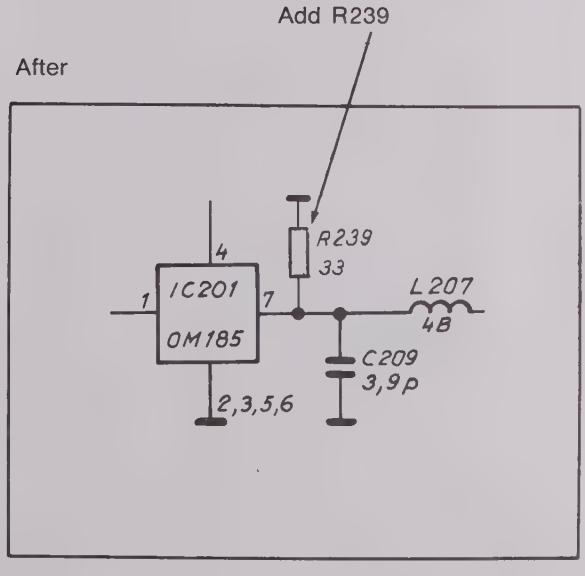


After



Add R239

After



Item	Description	Ordering Number
R215	27 k	4822 110 63145
R226	100	4822 110 63081

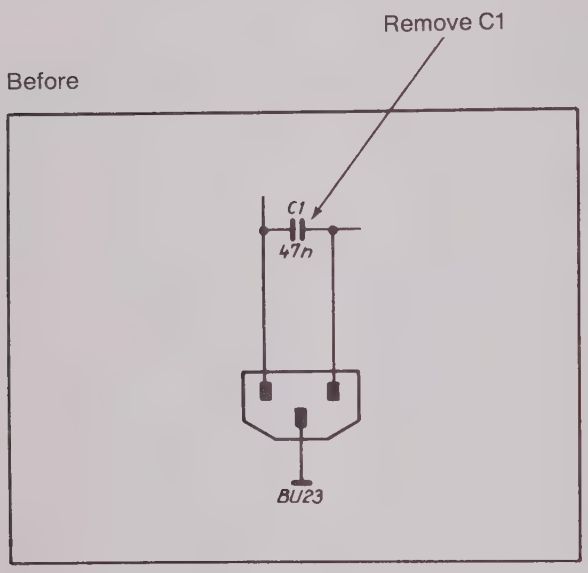
Item	Description	Ordering Number
R239	33	4822 110 63067

Power Supply

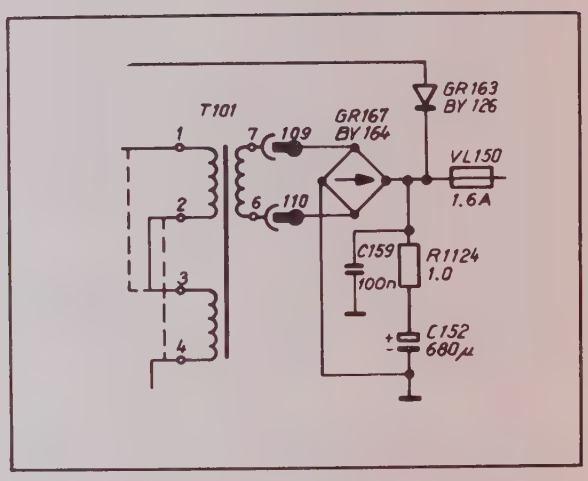
Improving the mains interference protection

Trouble symptom: high frequency interference is affecting radio receiving.

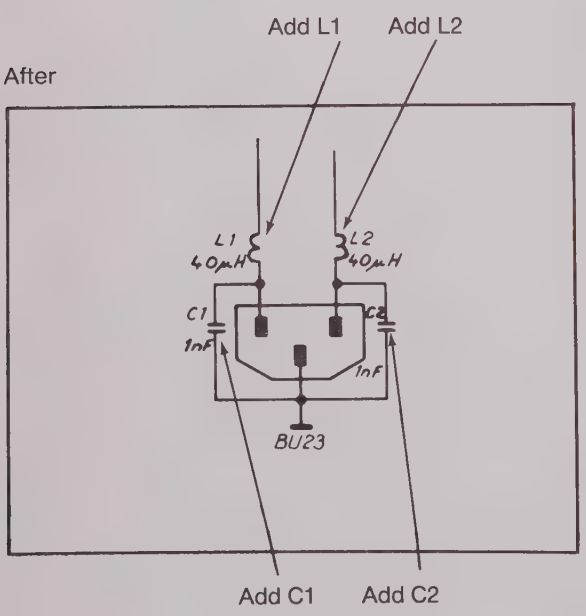
Before



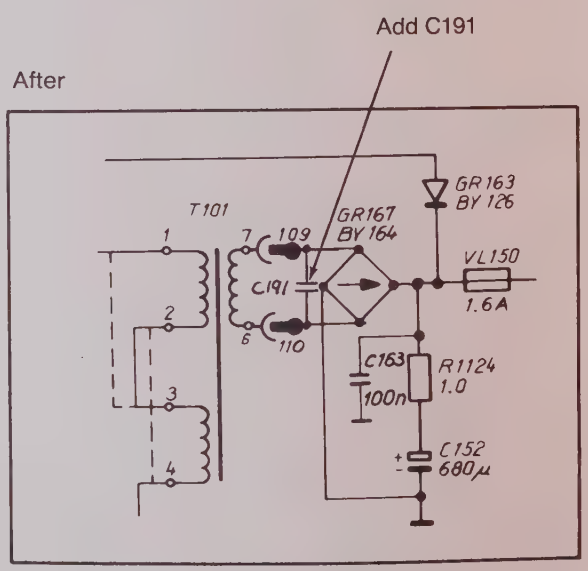
Before



After



After



Item	Description	Ordering Number
L1, L2	40 µH	5322 121 44235
C1, C2	1 nF	4822 122 31175

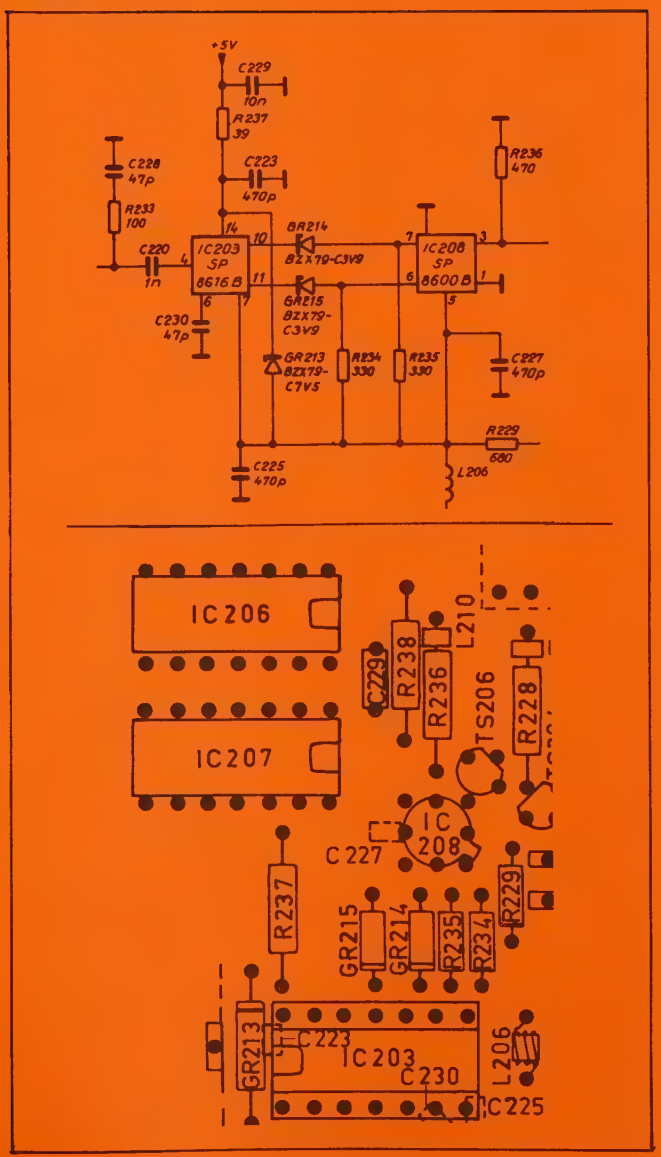
Item	Description	Ordering Number
C191	100 nF	5322 121 40323

Modification of the prescaler unit for PM 6625

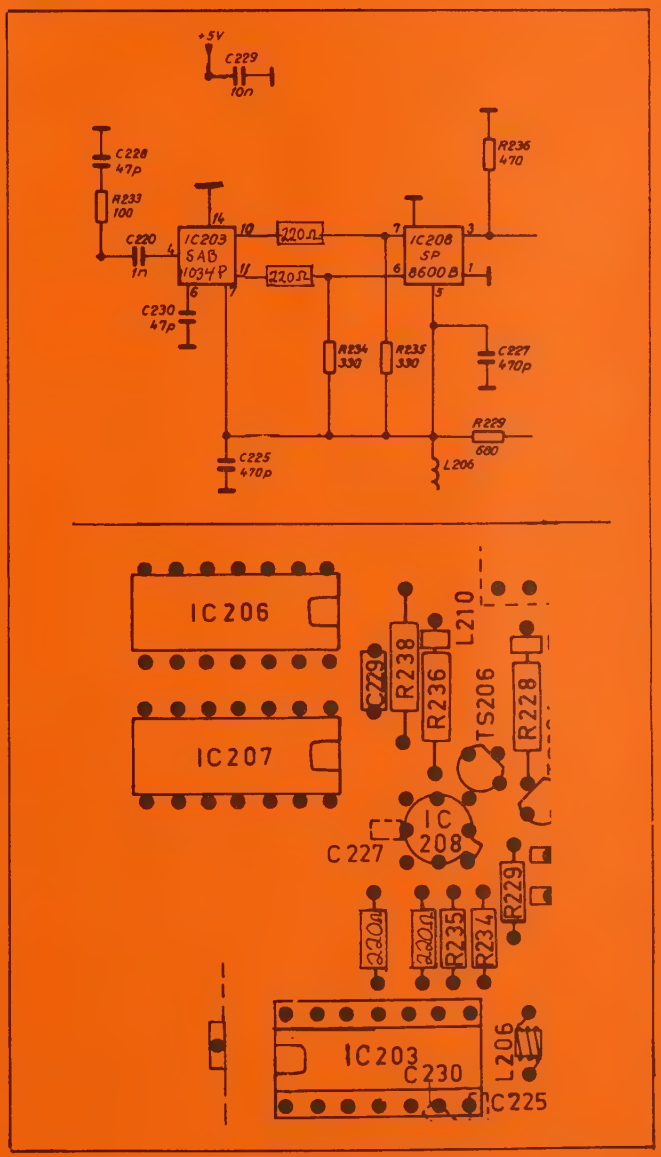
Due to cancelled production of SP8616B from Plessey following modification is introduced in our production line from August 1979.

1. SP8616B is replaced by Philips SAB 1034P or Plessey SP8610B.
2. Terminal 14 of IC203 is earthed.
3. GR214 and GR215 is replaced by two 220ohm resistors of type CR16 from Elcoma.
4. R237, C223 and GR213 are removed.

Before



After

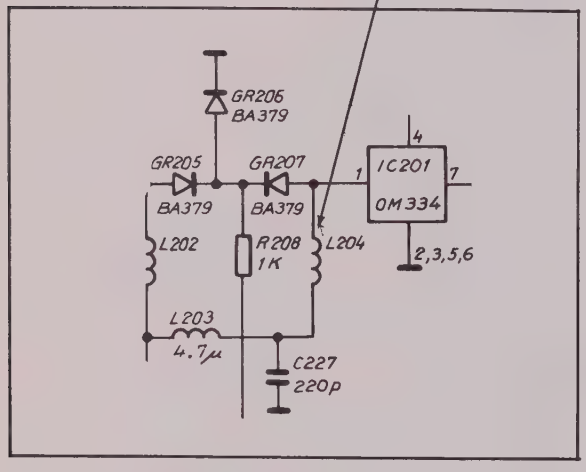


Prescaler PM 6624

Improving the sensitivity

Trouble symptom: poor sensitivity at 40 MHz.

Check L204 for short circuits to ground

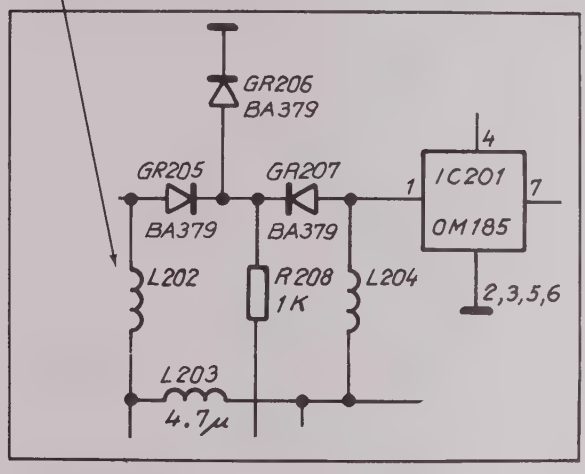


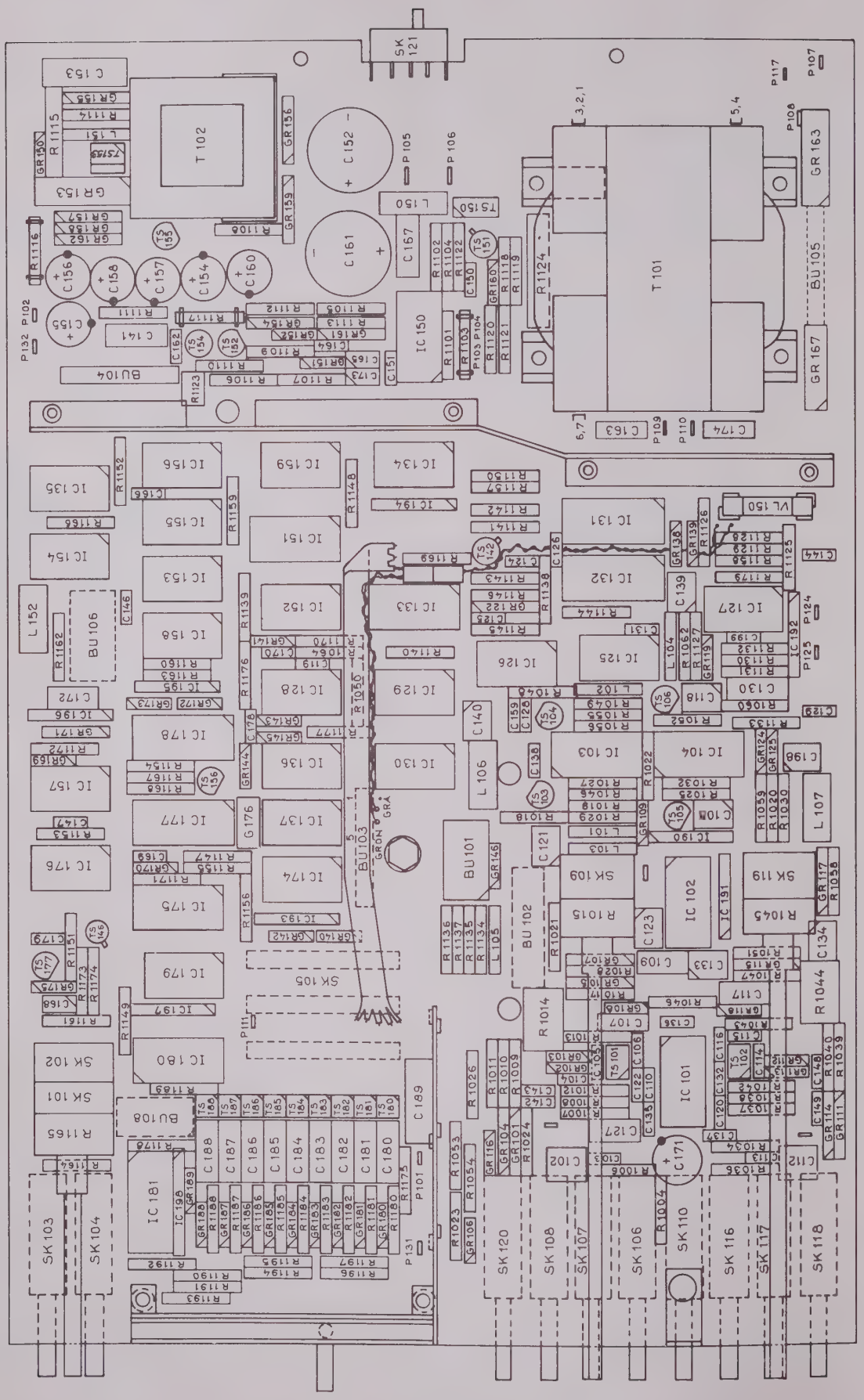
Prescaler PM 6625

Improving the sensitivity

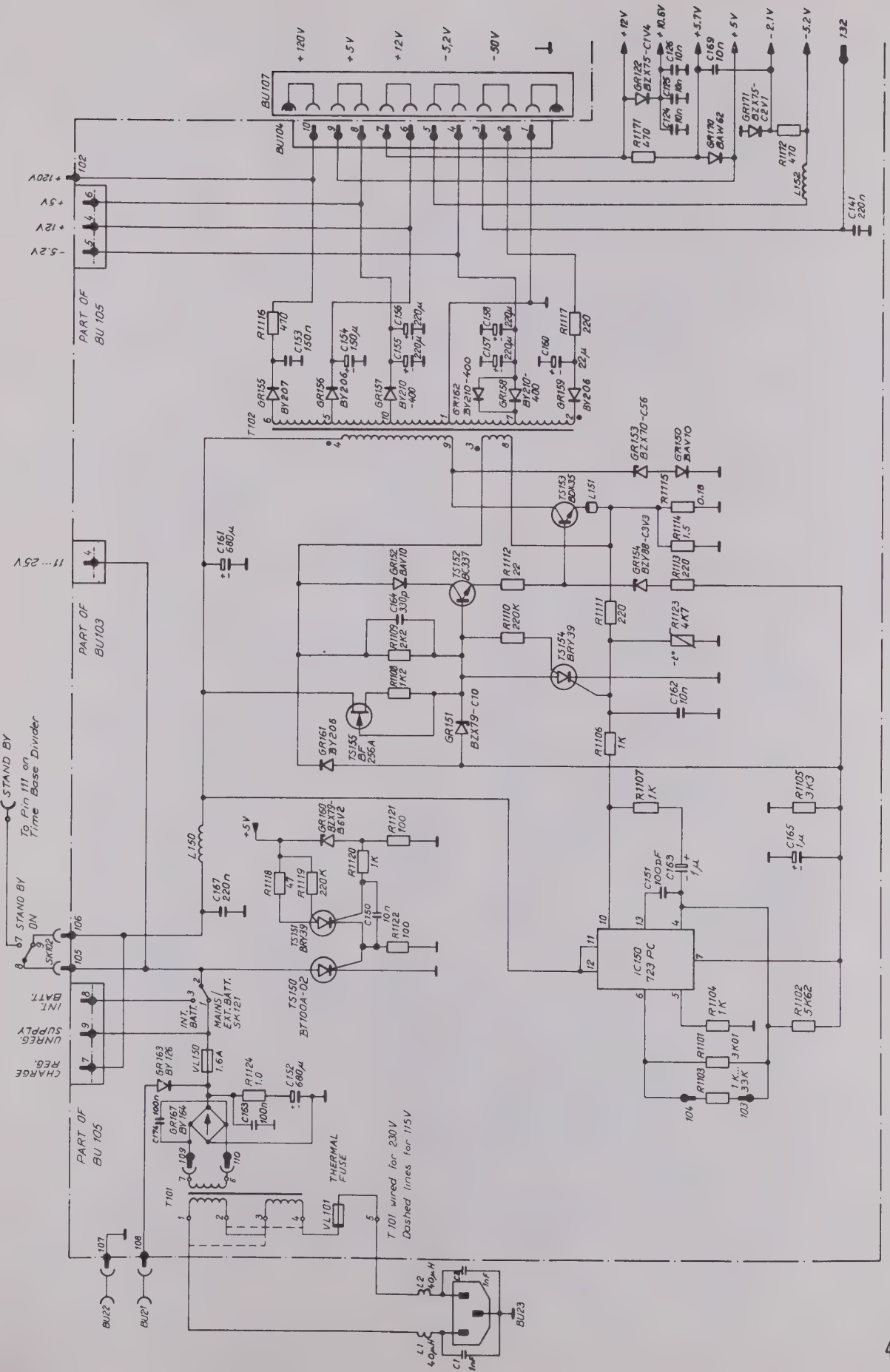
Trouble symptom: poor sensitivity at 185 MHz.

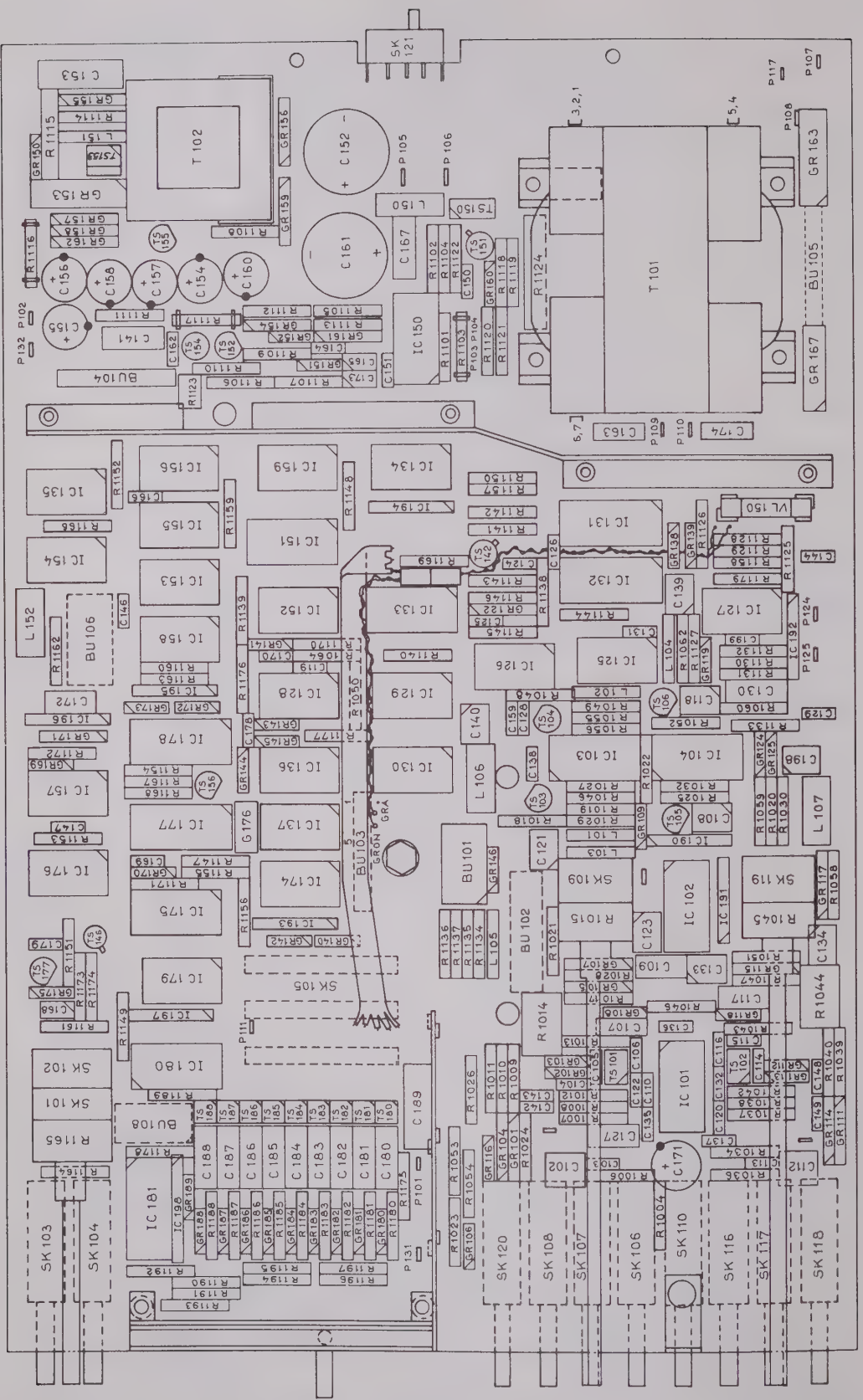
Check L202 for short circuits to ground



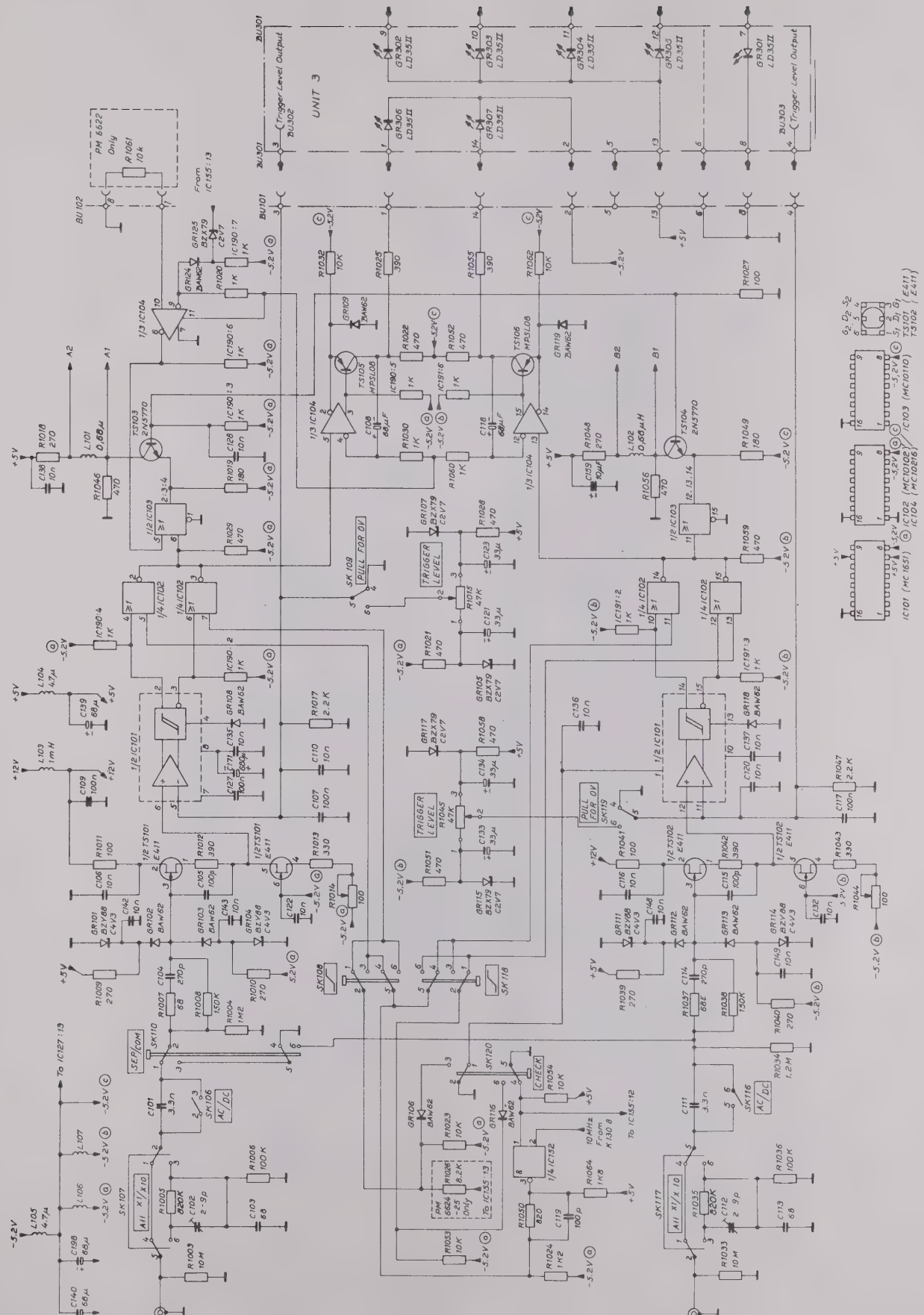


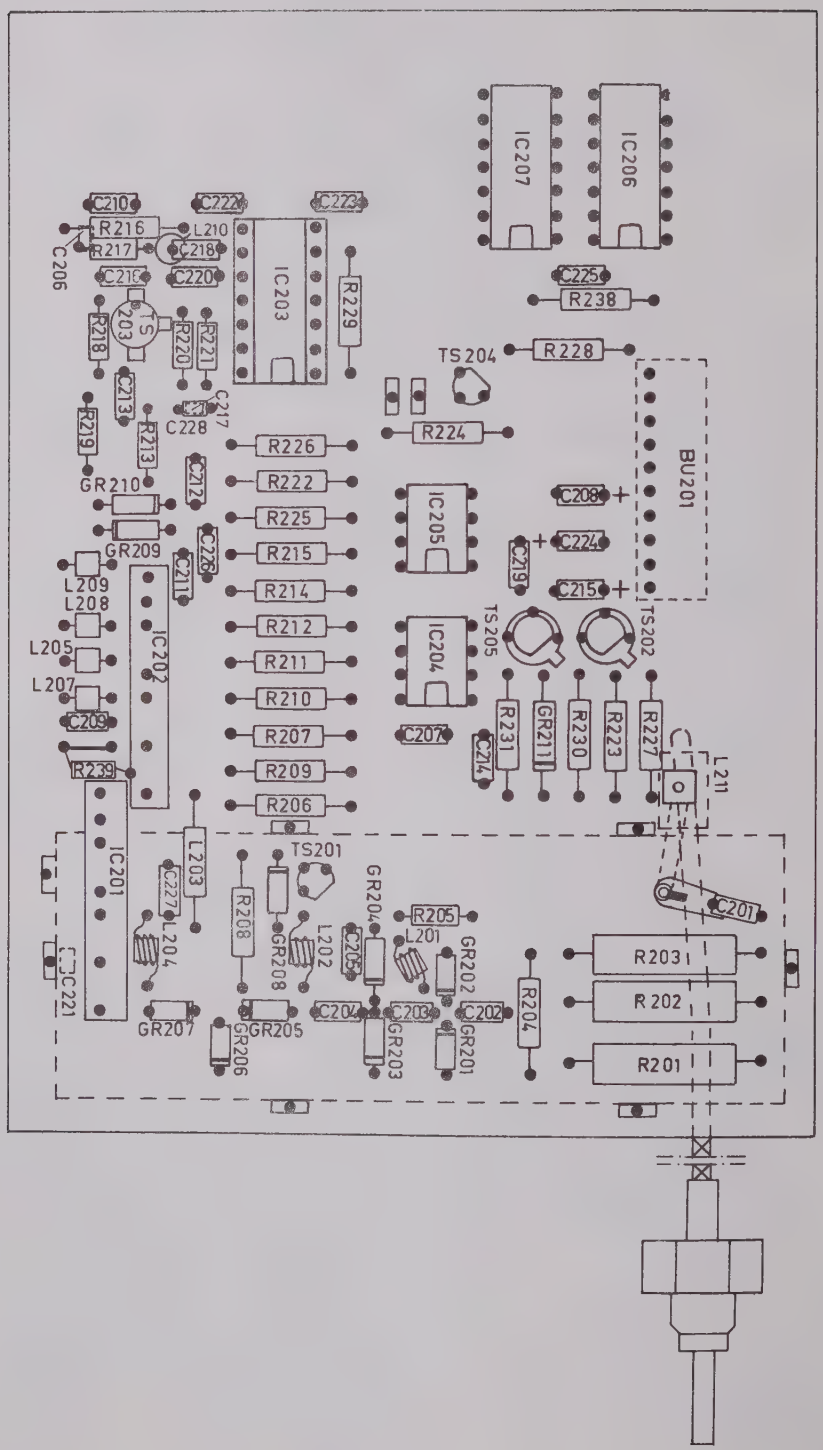
Power Supply





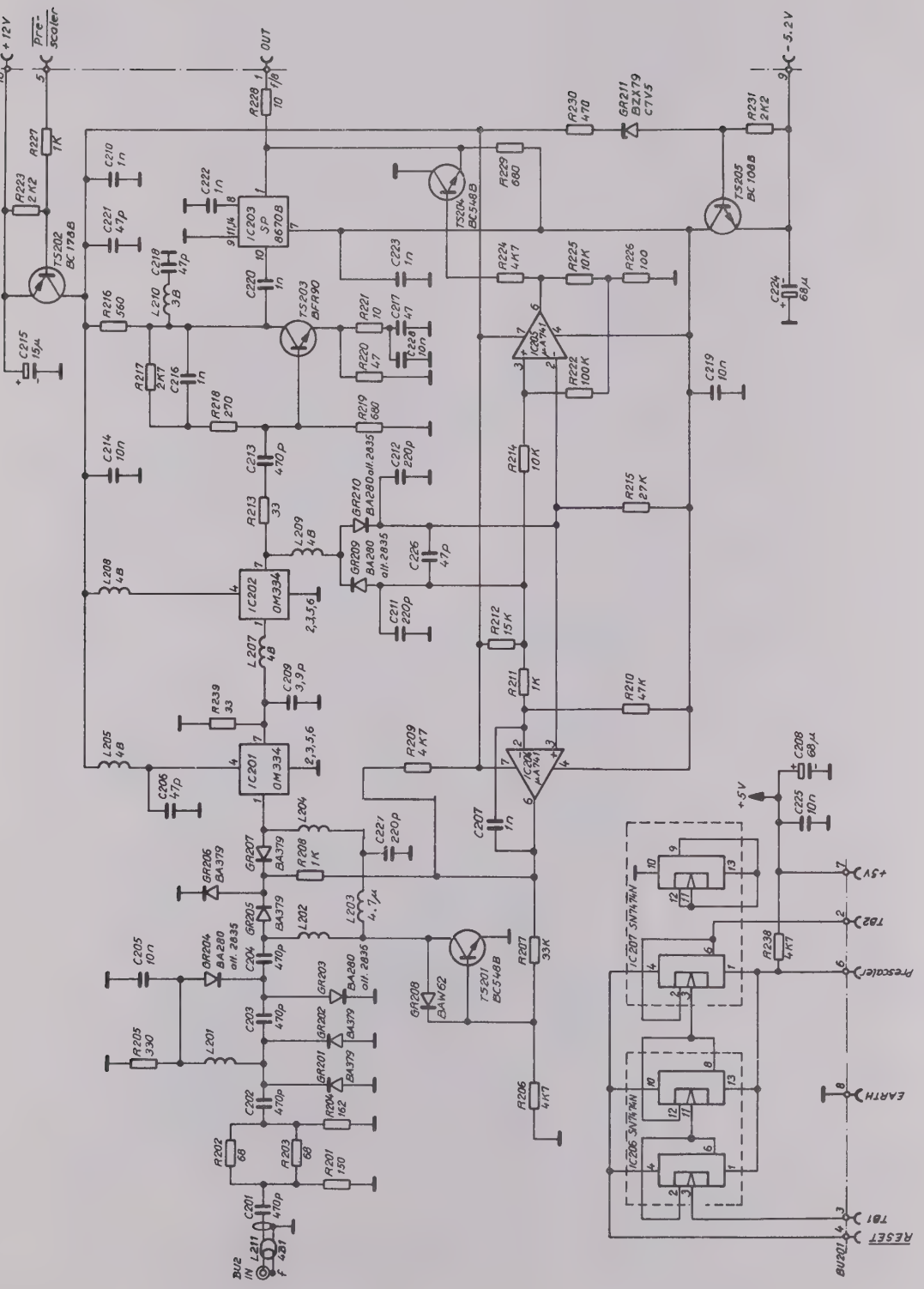
Input Amplifier

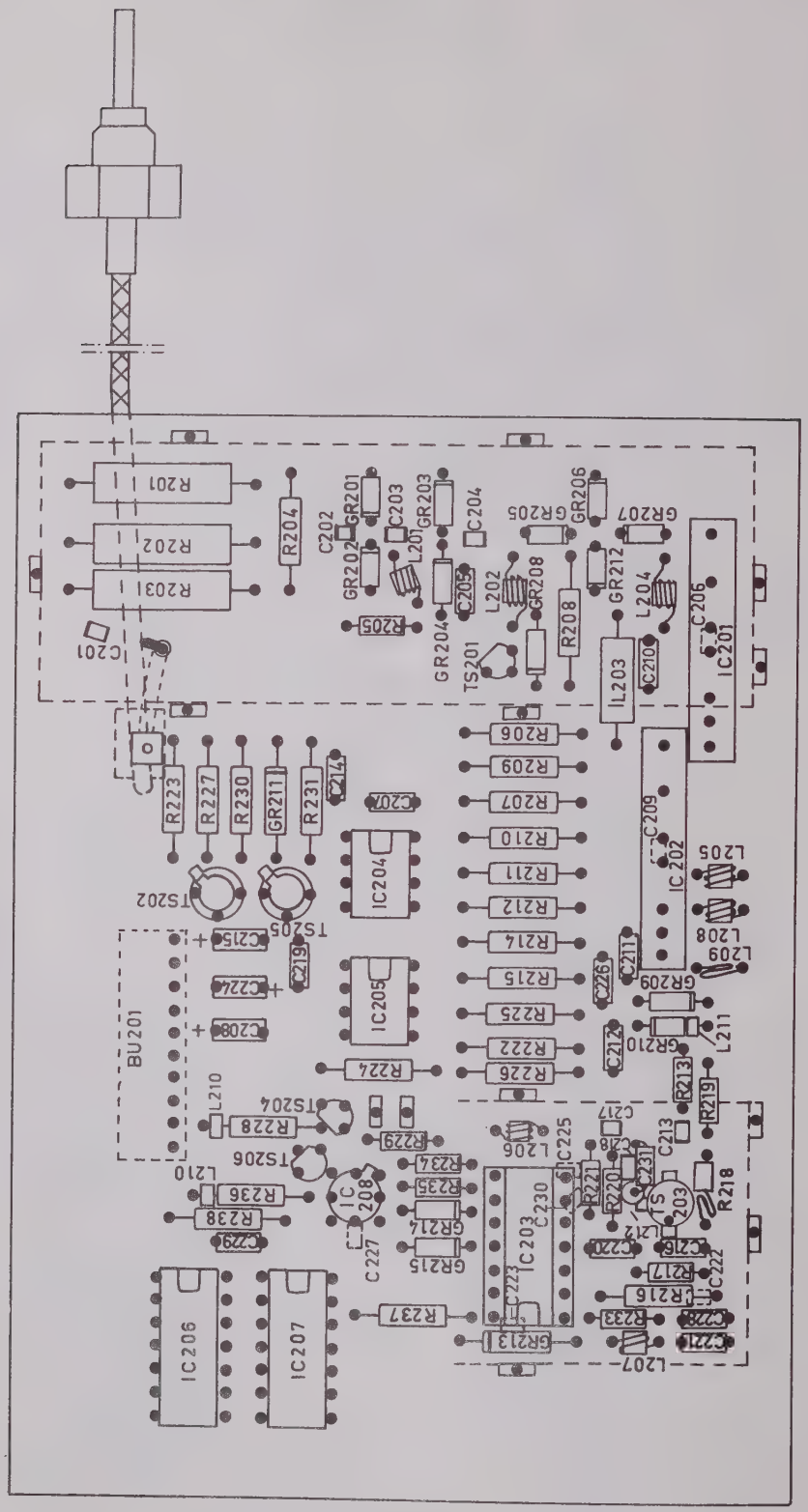



IC207
IC206
IC203
IC205
IC204
IC202
IC201
BU201
C210
C222
C223
R216
R217
L210
C218
C206
C216
C220
R229
TS203
R218
R220
R221
C213
C217
C228
R219
R213
R226
R222
R225
R215
R214
R212
R211
R210
R207
R209
R206
GR210
GR209
C212
C226
C211
L209
L208
L205
L207
C209
R239
C225
R238
TS204
R228
R224
C208
C224
C219
C215
TS205
TS202
R231
GR211
R230
R223
R227
C207
C214
L211
C201
R203
R202
R201
R204
GR202
GR201
GR203
GR204
R205
L201
C205
C204
C203
C202
TS201
L203
C227
L204
R208
GR208
L202
GR207
GR205
GR206
C221

Prescaler

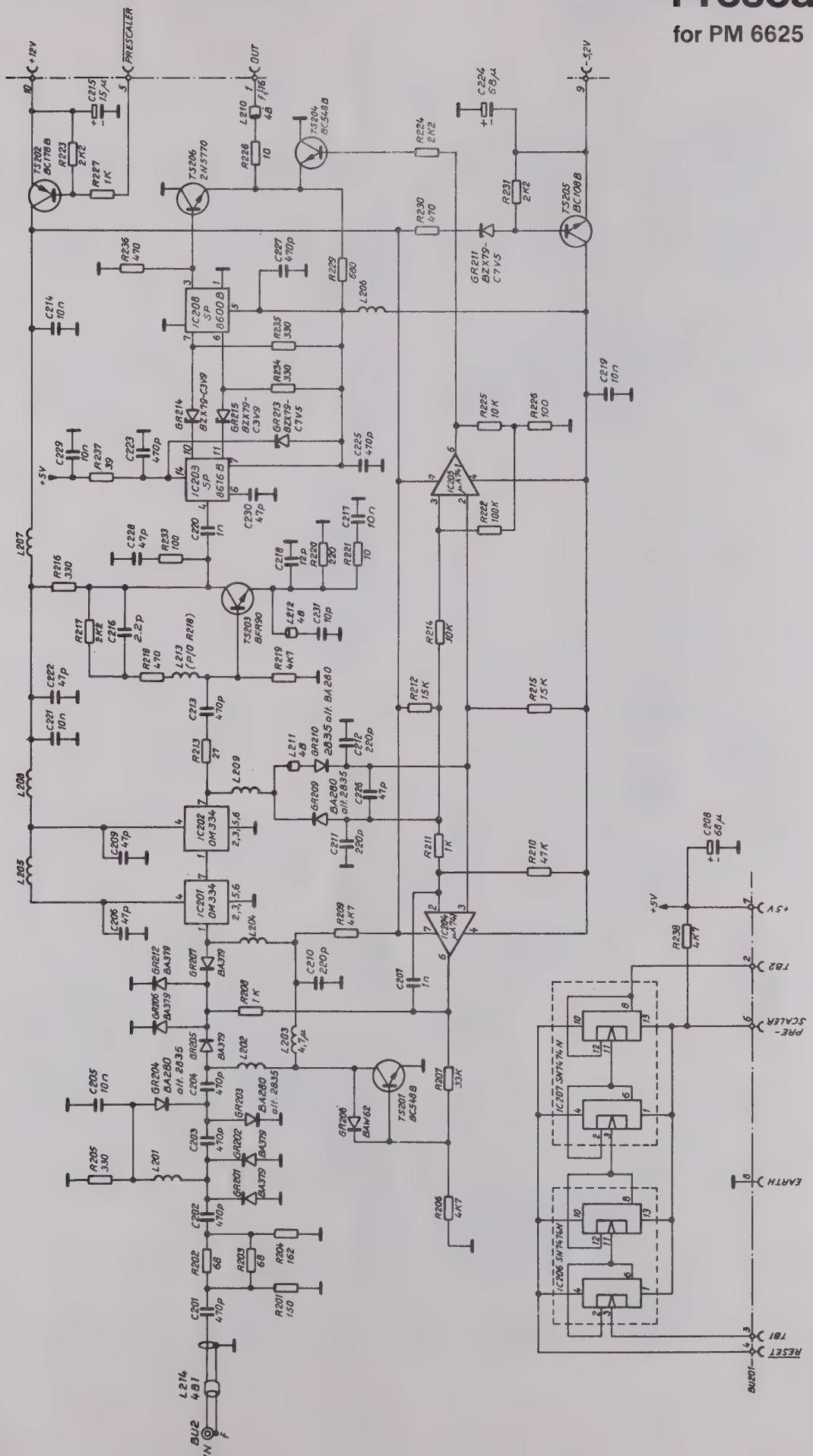
for PM 6624

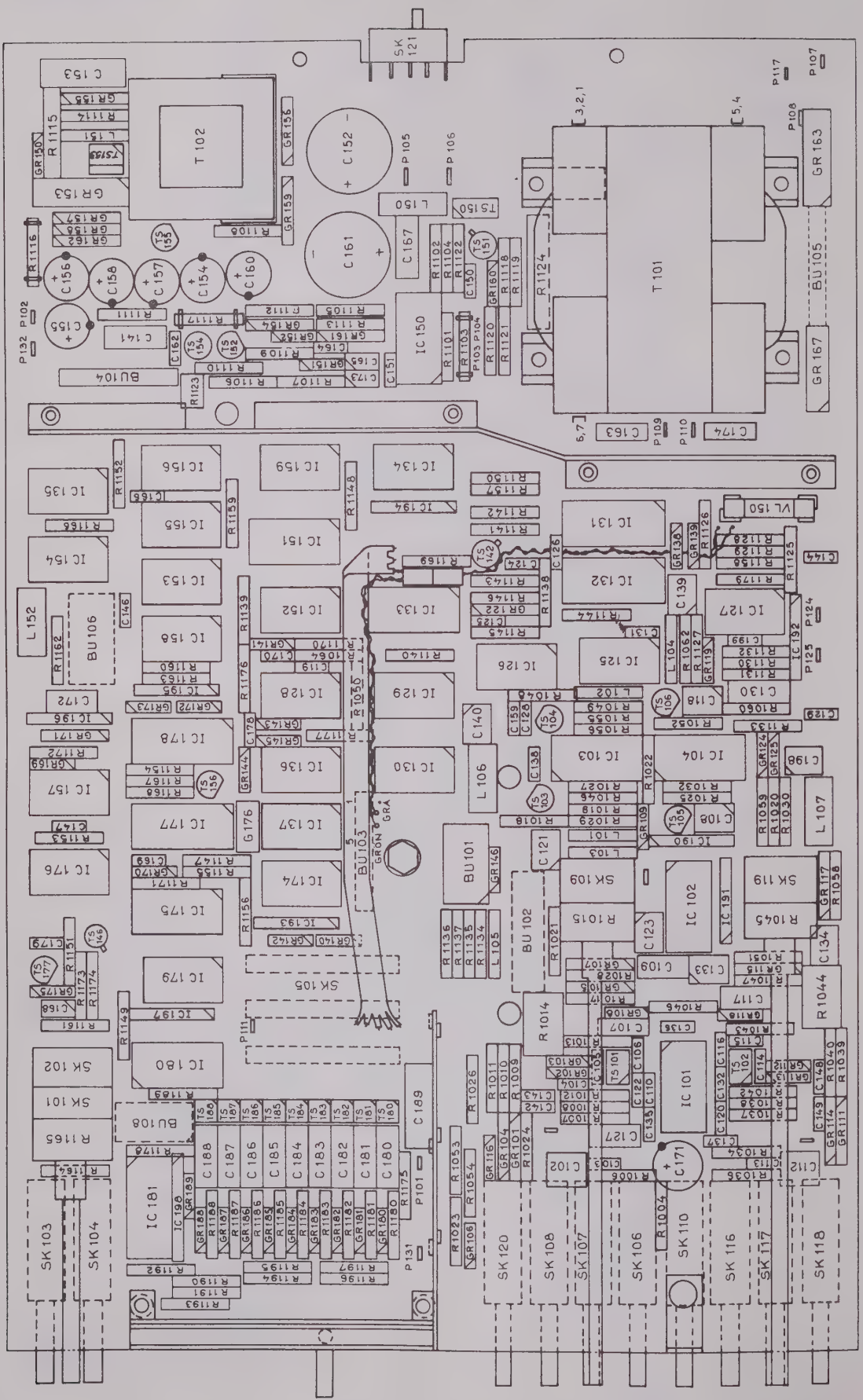


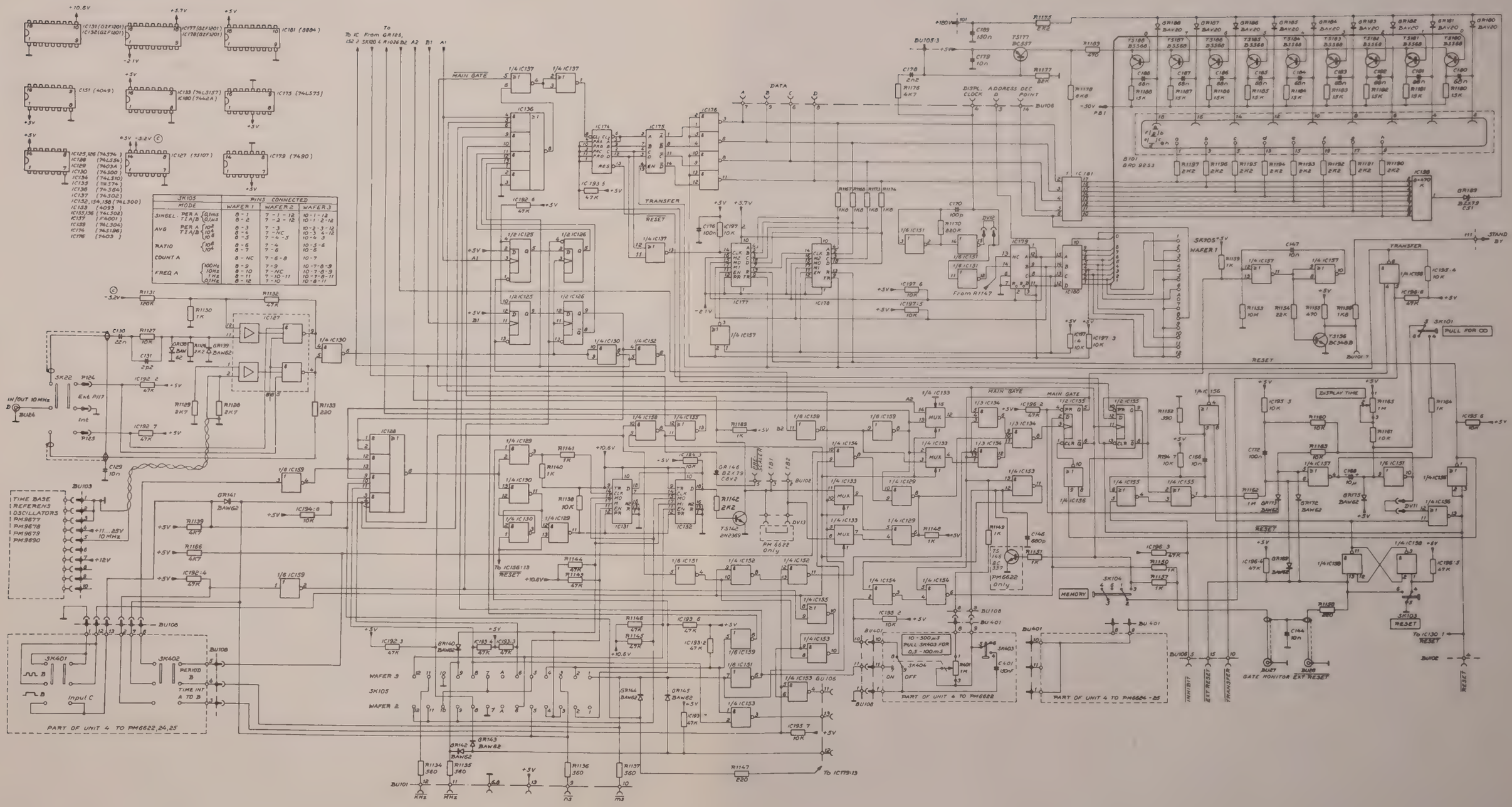

R201
R202
R2031
C201
R204
C202
GR201
GR202
C203
L201
GR203
C204
R205
GR204
C205
L202
GR205
GR206
GR207
GR208
R208
GR212
L204
C206
TS201
L203
C210
IC201
R206
R209
R207
R210
R211
R212
R214
R215
R225
R222
R226
C209
IC202
L205
L208
L209
C211
GR209
C226
C212
GR210
L211
R213
R219
C217
C213
C225
L206
C231
R221
R220
TS203
R218
C230
IC203
C223
C227
GR214
GR215
C229
R234
R235
R236
R238
IC208
L210
TS206
R228
TS204
R229
BU201
C208
C224
C215
C219
TS205
TS202
R223
R227
R230
GR211
R231
C214
IC204
IC205
R224
IC206
IC207
R237
GR213
C220
C216
R217
R216
C222
R233
C228
C221
L207

Prescaler

for PM 6625






SK105
MODE
PINS CONNECTED
WAFER 1
WAFER 2
WAFER 3
SINGEL - PER A T1A/B 0,1ms 0,1ms
AVG PER A T2A/B 10^2 10^5 10^6
RATIO 10^6 10^5
COUNT A
FREQ A 100Hz 10Hz 1Hz 0,1Hz
IC131 (GZF1201) IC132 (GZF1201)
IC177 (GZF1201) IC178 (GZF1201)
IC181 (8804)
IC151 (4049)
IC133 (74LS157) IC180 (74442A)
IC175 (74LS75)
IC125,126 (74S74) IC188 (74LS54) IC189 (7403A) IC130 (74S00) IC134 (74LS30) IC135 (74S64) IC137 (74S02) IC152,154,158 (74LS00) IC159 (4093) IC155,136 (74LS02) IC157 (F4001) IC139 (74LS04) IC174 (74S196) IC176 (74103)
IC127 (75107)
IC179 (7490)
MAIN GATE
TRANSFER
RESET
DATA
DISPL. ADDRESS DEC POINT
CLOCK
PB1
PART OF UNIT 4 TO PM6622,24,25
PART OF UNIT 4 TO PM6622
PART OF UNIT 4 TO PM6622 - 25
TIME BASE REFERENS OSCILLATORS PM9877 PM9678 PM9679 PM9890
11...25V 10 MHz
IN/OUT 10 MHz
Ext
Int
INPUT C
PERIOD B
TIME INT A TO B
10 - 300 m3
PULL SK403 FOR 0,5 - 100 m3
MEMORY
PULL FOR CD
STAND BY
INHIBIT
EXT RESET
TRANSFER
GATE MONITOR
EXT RESET
DISPLAY TIME
To IC179:13
To IC130:1 RESET

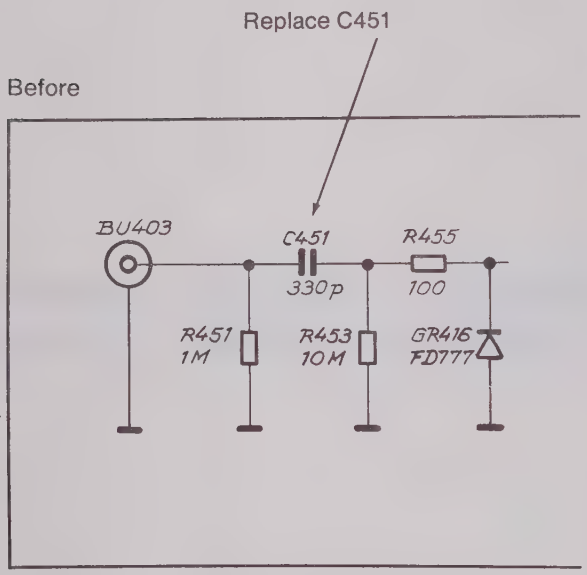
PM 6661 80 MHz counter
PM 6664 520 MHz counter

PM 6664 only

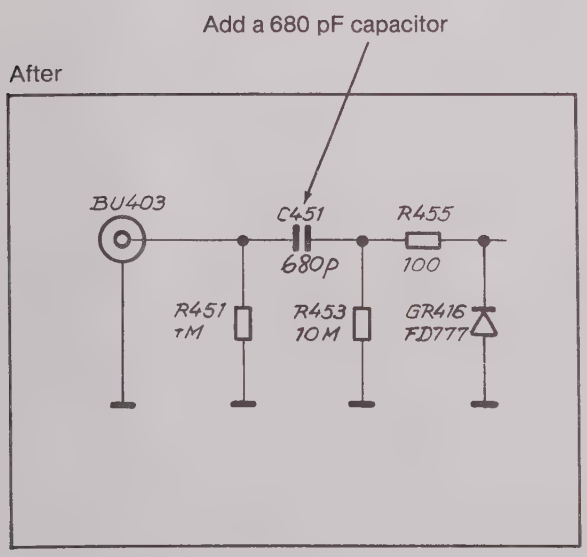
Improving the Sensitivity

Trouble symptom: poor sensitivity at low frequencies.

Before



After



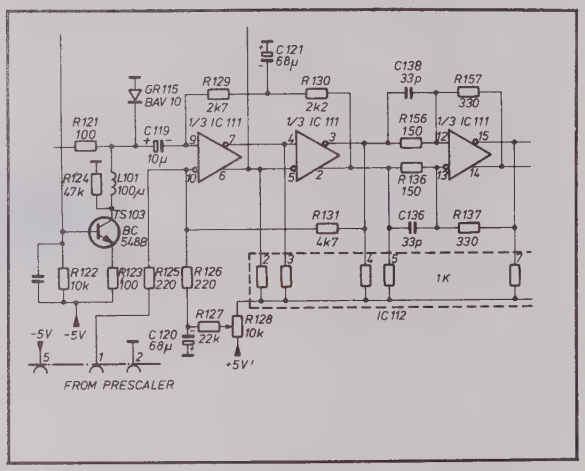
Item	Description	Ordering Number
C451	680 pF	4822 122 31178

PM 6664 only

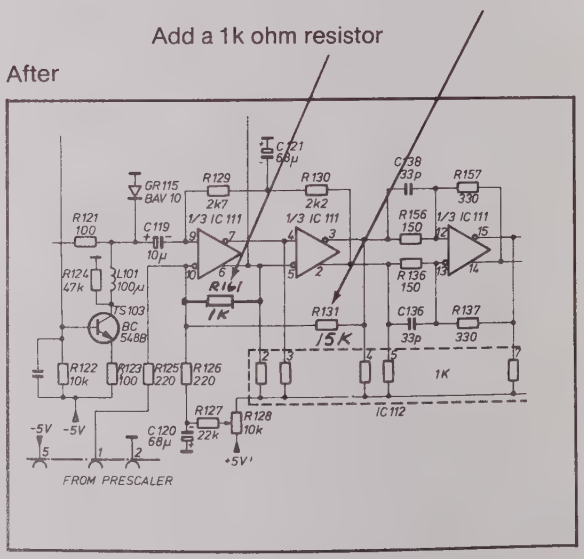
Improving the frequency response

Trouble symptom: high frequency interference at low frequency measurement.

Before



After



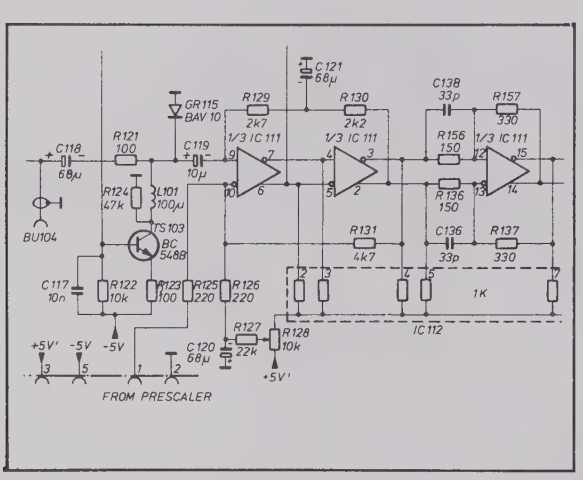
Item	Description	Ordering Number
R131	15 k ohm	4822 110 63138
R161	1 k ohm	4822 110 63107

PM 6664 only

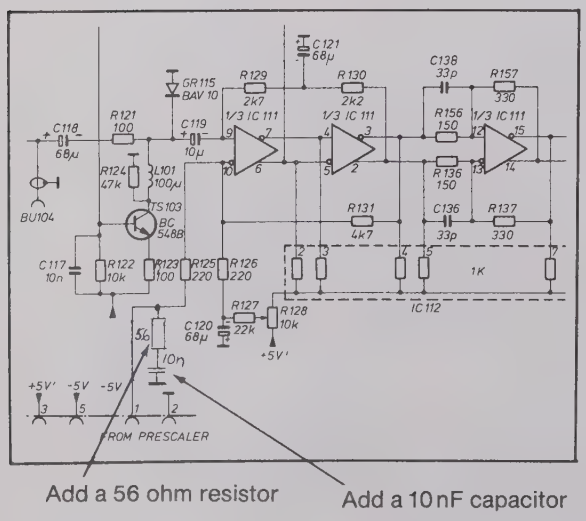
Improving the AGC Circuits

Trouble symptom: wrong display read out at low frequencies

Before



After



Add a 56 ohm resistor

Add a 10 nF capacitor

Item	Description	Ordering Number
R	56 ohm	4822 110 63074
C	10 nF	5322 122 34041

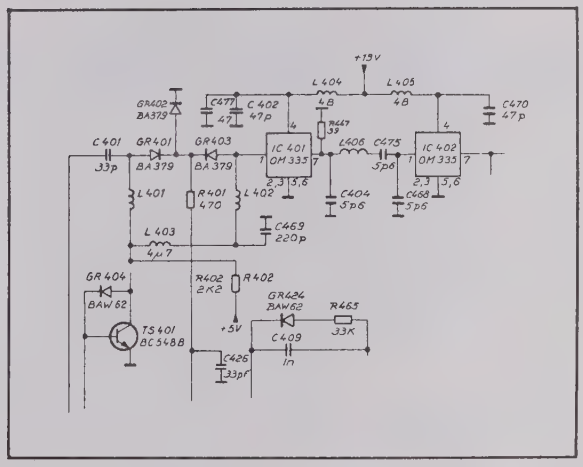
Note: Earth the capacitor at the anode of GR 115

PM 6664 only

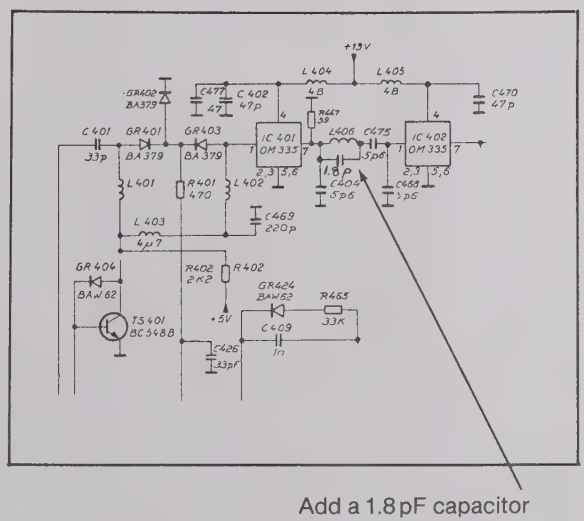
Improving the Amplifier Circuits

Trouble symptom: the display read out is twice the input frequency at 280 MHz and high signal level.

Before



After



Add a 1.8 pF capacitor

Item	Description	Ordering Number
C	1.8 pF	4822 122 31034

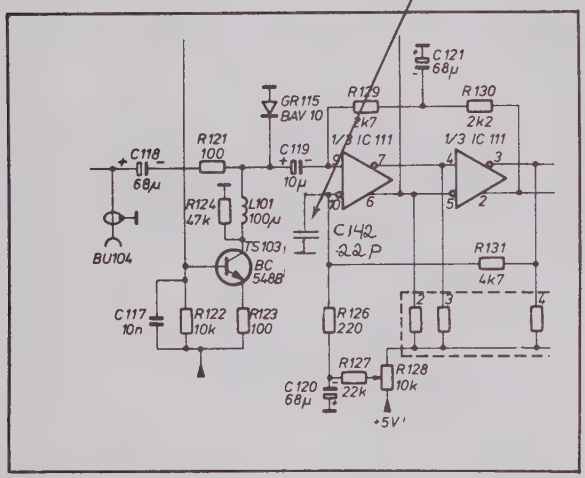
PM 6661 only

Improving the frequency response

Trouble symptom: high frequency interference at low frequency measurement.

Remove C142

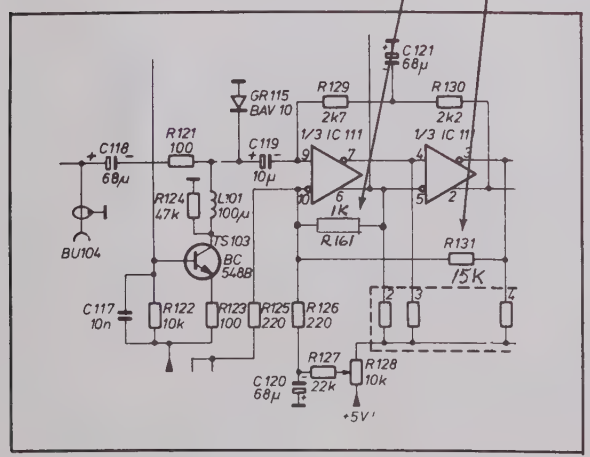
Before



Change value of R131 to 15k ohm

Add a 1k ohm resistor

After



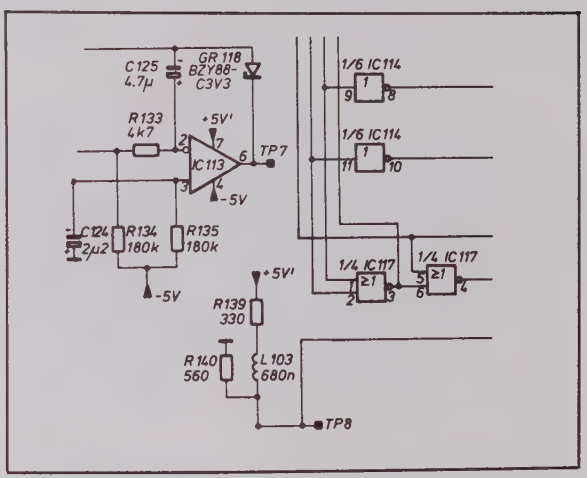
Item	Description	Ordering Number
R131	15 k ohm	4822 110 63138
R161	1 k ohm	4822 110 63107

PM 6661 and PM 6664

Improving the blanking

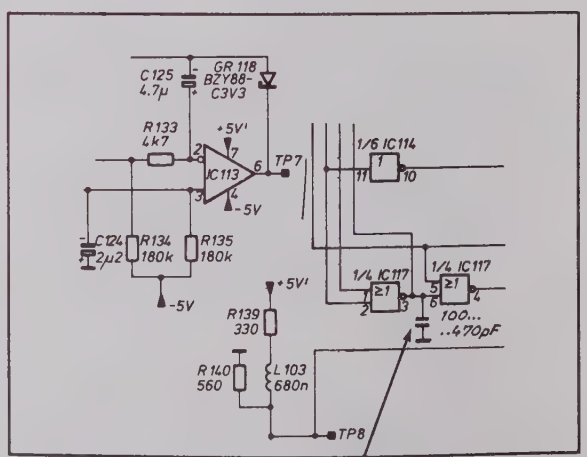
Trouble symptom: poor blanking

Before



Replace IC 117 and IC 124 with RCA or Motorola types. If only Philips or Fairchild types are available add a 100 pF...470 pF capacitor as shown below

After



Add a 100 pF...470 pF capacitor

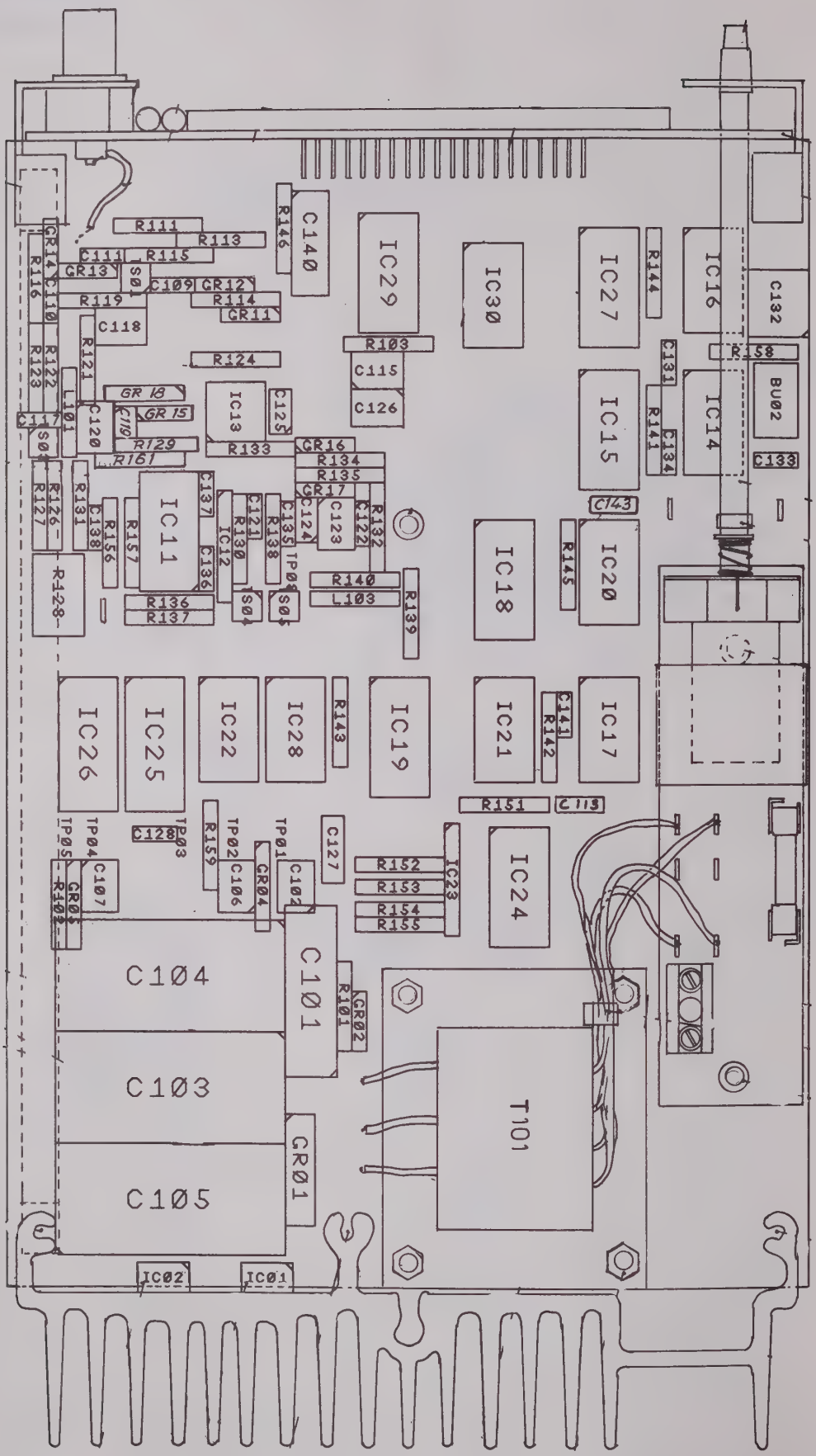
Circuit diagrams for PM 6661 and PM 6664

Basic Board

for PM 6664

Basic Board

for PM 6661



POWER SUPPLY

MAINS SUPPLY

LIVE NEUTR.

PM 6661 only

PM 6664 only

FROM PRESCALER

Prescaler

Transfer

Reset

IC 101 (7805)
IC 102 (7905)

IC 111 (MC 10216P)

IC 113 (SN 72741P)

IC 114 (F 4069 PC)
IC 116 (F 4024 PC)
IC 117 (F 4001 PC)
IC 121 (SN 74 LS 02 N)
IC 122 (SN 74 S 196 N)
IC 128 (SN 74 S 00 N)
IC 130 (SN 74 LS 10 N)

IC 118 (F 4049 PC)
IC 119 (F 4050 PC)

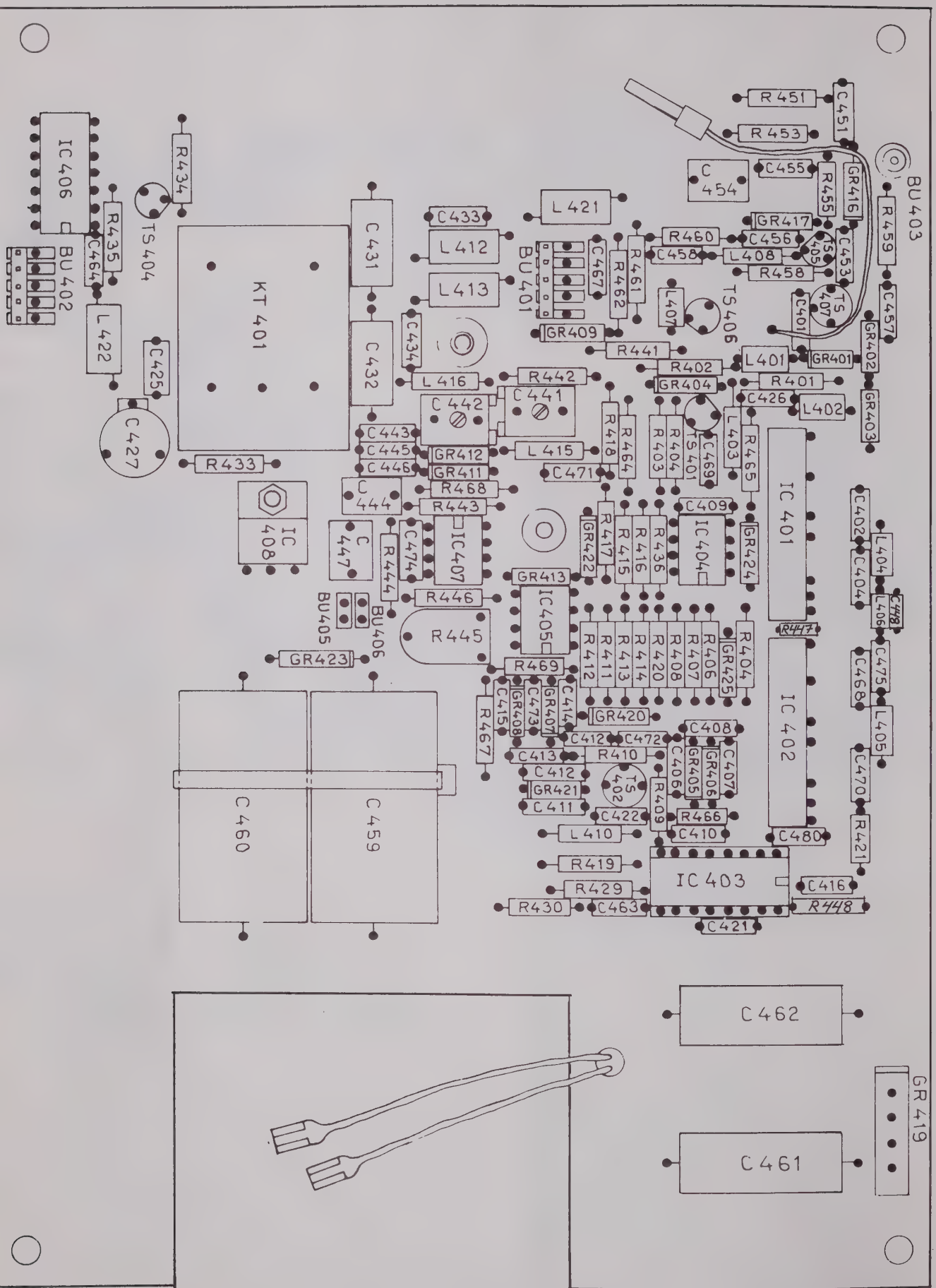
IC 115 (F 4040 PC)
IC 124 (MC 14076 CP)
IC 127 (F 4556 PC)
IC 129 (SN 74 247)

IC 125 (GZF 1201 P)
IC 126 (GZF 1201 P)

IC 120 (SN 74 LS 90 N)

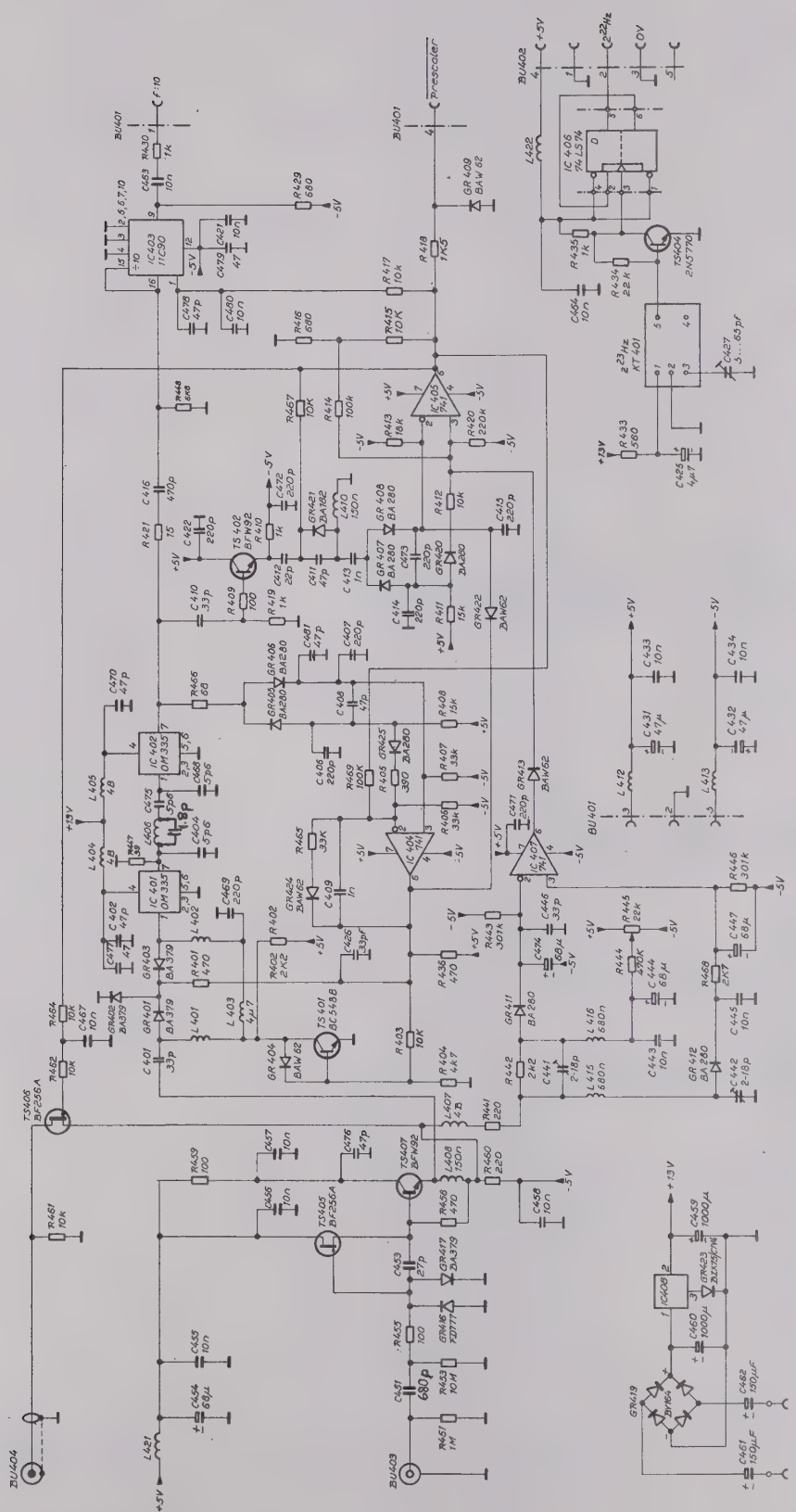
rescaler

r PM 6664



Prescaler

for PM 6664



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Spare Parts

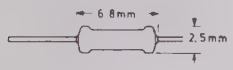
PM 6610 series of counters

PM 6620 series of counters

PM 6661 80 MHz counter
PM 6664 520 MHz counter

Carbon Film
Manufacturer: Elcoma
Type: CR25

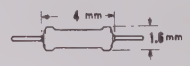
P at 70°C: 0.33 W
Tolerance up to 1 M: 5 %
Tolerance from 1.2 M: 10 %



Ω	Ordering Number
1.5	4822 110 63032
10	4822 110 63054
22	4822 110 63063
33	4822 110 63067
39	4822 110 63069
47	4822 110 63072
56	4822 110 63074
68	4822 110 63076
100	4822 110 63081
120	4822 110 63063
180	4822 110 63087
220	4822 110 63089
270	4822 110 63092
330	4822 110 63094
390	4822 110 60006
470	4822 110 63098
560	4822 110 63101
680	4822 110 63103
820	4822 110 63105
1k	4822 110 63107
1.2k	4822 110 63109
1.8k	4822 110 63114
2.2k	4822 110 63116
2.7k	4822 110 63118
3.3k	4822 110 63121
3.9k	4822 110 63123
4.7k	4822 110 63125
5.6k	4822 110 63127
6.8k	4822 110 63129
8.2k	4822 110 63132
10k	4822 110 63134
12k	4822 110 63136
15k	4822 110 63138
18k	4822 110 63141
22k	4822 110 63143
27k	4822 110 63145
33k	4822 110 63147
47k	4822 110 63152
100k	4822 110 63161
120k	4822 110 63163
150k	4822 110 63165
180k	4822 110 63167
220k	4822 110 63169
820k	4822 110 63185
1M	4822 110 63187
1.2M	4822 110 63189
3.3M	4822 110 63201
10M	4822 110 63214

Carbon Film
Manufacturer: Elcoma
Type: CR16

P at 70°C: 0.2 W
Tolerance up to 220 k: 5 %
Tolerance from 270 k: 10 %



Ω	Ordering Number
10	4822 111 30347
33	4822 111 30067
47	4822 111 30245
56	4822 111 30309
100	4822 111 30324
270	4822 111 30323
330	4822 111 30328
470	4822 111 30331
560	4822 111 30309
680	4822 111 30272
1k	4822 111 30269
2.2k	4822 111 30265
2.7k	4822 111 30264
4.7k	4822 111 30312

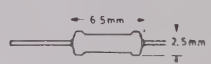
Lacquered Metal Film
Manufacturer: Elcoma
Type: MR30

P at 70°C: 0.5 W
Tolerance: 1 %

Ω	Ordering Number
332k	5322 116 54337
909k	5322 116 54408

Lacquered Metal Film
Manufacturer: Elcoma
Type: MR25

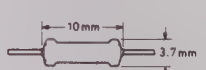
P at 70°C: 0.4 W
Tolerance: 1 %



Ω	Ordering Number
162	5322 116 50417
2.00k	5322 116 54572
3.01k	5322 116 50524
5.11k	5322 116 54595
5.62k	5322 116 54011
10k	5322 116 50747

Power Metal Film
Manufacturer: Elcoma
Type: PR37

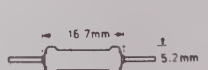
P at 70°C: 1.6 W
Tolerance: 5 %



Ω	Ordering Number
22	4822 116 51147
68	5322 116 54984
150	4822 116 51142

Power Metal Film
Manufacturer: Elcoma
Type: PR52

P at 70°C: 2.5 W
Tolerance: 5 %



Ω	Ordering Number
68	5322 116 54396

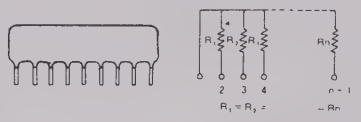
NTC Thermistor
Manufacturer: Elcoma
Type: 2322 642 1

P at 55°C: 0.5 W
Tolerance: 5 %

Ω at 25°C	Ω at 0°C	Ω at 50°C	Ordering Number
4.7 k	15 k	1.5 k	2322 116 20114

Standard Networks
Manufacturer: Koa Denko
Type: RK 1/8 B

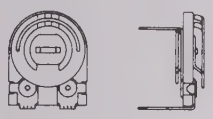
P at 70°C: Rn × 125 mW
Tolerance: 10 %
Max voltage: 200 V



Ω	Length	Ordering Number
1kx6	19.5	5322 111 94015
6.8kx6	19.5	5322 111 94012
47kx6	19.5	5322 111 94031
470kx8	24.5	5322 111 94026

Ceramic Potentiometers
Manufacturer: Elcoma
Type: Cermet Preset

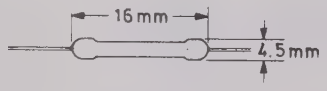
Lin/Log: Lin
P at 70°C: 0.5 W
Tolerance: 20 %



Ω	Ordering Number
100	5322 101 14011
10k	5322 100 10113
22k	5322 101 14069

Power Wire-Wound
Manufacturer: Vitrohm
Type: 200-0

P at 70°C: 1 W
Tolerance: 10 %



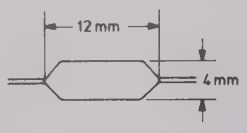
Ω	Ordering Number
1	4822 113 60084

Carbon Potentiometers

Description	Designation	Ordering no
500 Ω with 1 switch	Sensitivity Control PM 6610 series	5322 101 94008
1 kΩ without switch	Sensitivity Control PM 6612	5322 101 14069
47 kΩ with two switches	Trigger Level Control PM 6620 series	5322 101 64017
1 MΩ with two switches	Display Time Control PM 6610 and PM 6620 series	5322 101 94007
1 MΩ with two switches	Hold Off Control PM 6622	5322 101 54008

Metal Film
Manufacturer: Resista
Type: Rn-3

P at 70°C: 1 W
Tolerance: 10 %



Ω	Ordering Number
0.18	5322 116 54936

Chip Resistor
Manufacturer: Dale
Type: RC 575

P: 100 mW
Tolerance: 5 %

Ω	Ordering Number
22	5322 111 94111

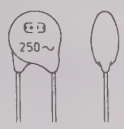
Carbon Mass
Manufacturer: Allan Bradley
Type: CB

P at 70°C: 0.25 W
Tolerance: 5 %

Ω	Ordering Number
56	5322 116 54446

Ceramic Disc
Manufacturer: Elcoma
Type: 2212 660

Rated ac voltage: 250 V
Tolerance: 20 %



Capacitance, pF	Ordering Number
1000	4822 122 31175

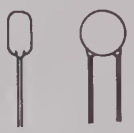
Ceramic Chip
Manufacturer: USCC
Type: Ceramolitic

Voltage: 50 V

Capacitance, pF	Tolerance, %	Ordering Number
5.6	10	5322 122 34096
10 000	20	5322 122 34006

Ceramic Plate
Manufacturer: Erie
Type: 831

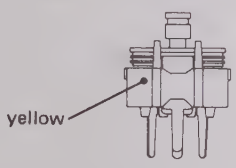
Tolerance: —20 +40 %
Voltage: 500 V



Capacitance, pF	Ordering Number
680	4822 122 31178
3300	5322 122 34044

Film Dielectric Trimmers
Manufacturer: Elcoma
Type: 2222 808

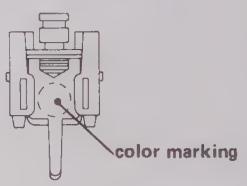
Voltage: 250 V



Capacitance, pF	Ordering Number	Colour Marking
5.5–65	4822 125 50017	Yellow

Film Dielectric Trimmers
Manufacturer: Elcoma
Type: 2222 809 090

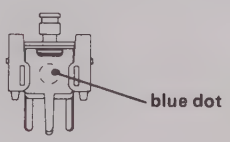
Voltage: 300 V



Capacitance, pF	Ordering Number	Colour Marking
2–9	6322 125 54024	White dot
2–18	5322 125 54029	Red dot

Film Dielectric Trimmers
Manufacturer: Elcoma
Type: 2222 809 080

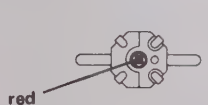
Voltage: 300 V



Capacitance, pF	Ordering Number	Colour Marking
5.5–65	5322 125 54003	Blue dot

Trimmer Capacitors
Manufacturer: Tekelek
Type: 9410 series

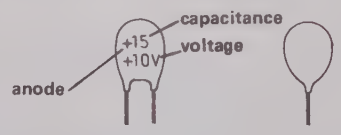
Voltage: 250 V



Capacitance, pF	Ordering Number	Colour Marking
1–4.5	5322 125 54055	Red

Tantalum Electrolytic
Manufacturer: Roederstein
Type: ETP 2

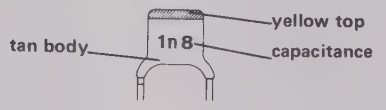
Voltage: 10 V
Tolerance: —20 +50 %



Capacitance, μF	Ordering Number
15	5322 124 14036

Miniature Ceramic Plate
Manufacturer: Elcoma
Type: 2222 630

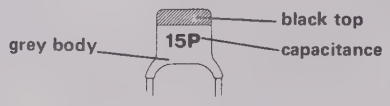
Voltage: 100 V
Tolerance: 10 %



Capacitance, pF	Ordering Number
180	4822 122 30045
220	4822 122 31173
330	4822 122 31165
470	4822 122 31177
680	4822 122 31178
1000	4822 122 31175
2200	4822 122 30114
3300	4822 122 30099
4700	4822 122 30128

Miniature Ceramic Plate
Manufacturer: Elcoma
Type: 2222 638

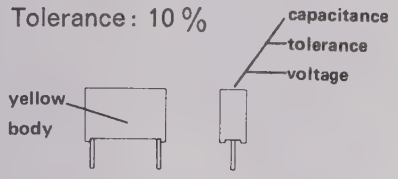
Voltage: 100 V
Tolerance: 0.25 pF or 2 %



Capacitance, pF	Ordering Number
1.8	4822 122 31034
2.2	4822 122 31036
3.9	4822 122 31043
10	4822 122 31054
33	4822 122 31067
47	4822 122 31072
68	4822 122 31076
82	4822 122 31078
100	4822 122 31081

Metallized Polyester and Polycarbonate Film
Manufacturer: Elcoma
Type: 2222 344

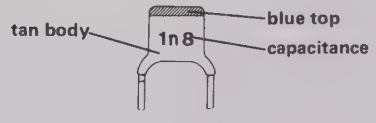
Tolerance: 10 %



Capacitance, µF	Voltage, V	Ordering Number
0.022	630	4822 121 40407
0.022	250	5322 121 40308
0.033	250	5322 121 44025
0.068	250	5322 121 44137
0.1	100	5322 121 40323
0.15	250	4822 121 40104
0.22	100	4822 121 40232

Miniature Ceramic Plate
Manufacturer: Elcoma
Type: 2222 640

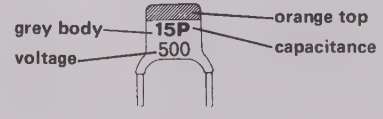
Voltage: 100 V
Tolerance: —20+50 %



Capacitance, pF	Ordering Number
10000	5322 122 34041

Miniature Ceramic Plate
Manufacturer: Elcoma
Type: 2222 650

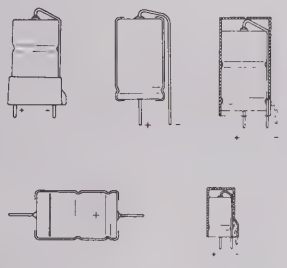
Voltage: 500 V
Tolerance: 2 %



Capacitance, pF	Ordering Number
270	5322 121 54047

Aluminium Electrolytic
Manufacturer: Elcoma
Type: 2222 015...17

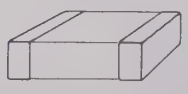
Tolerance: —10+50 %



Capacitance, µF	Voltage, V	Ordering Number
22	63	4822 124 20499
47	10	4822 124 20461
150	16	4822 124 20586
220	10	4822 124 20589
680	40	4822 124 20534
680	6.3	4822 124 20513
1500	16	4822 124 20525

Ceramic Chip
Manufacturer: Elcoma
Type: 2222 851

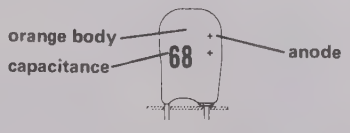
Voltage: 50 V



Capacitance, pF	Tolerance, %	Ordering Number
12	10	5322 122 34042
15	20	5322 122 34097
47	10	5322 122 34043
470	20	5322 122 34099
10 000	20	4322 122 34098

Solid Aluminium Electrolytic
Manufacturer: Elcoma
Type: 2222 122

Tolerance: —10+50 %



Capacitance, µF	Voltage, V	Ordering Number
1	25	5322 124 14075
4.7	10	5322 124 14064
10	6.3	5322 124 14066
15	16	5322 124 14036
33	10	5322 124 14053
68	6.3	5322 124 14079

Voltage Regulator Diodes

Type	Ordering Number
BZX 70-C56	5322 130 34401
BZX 75-C1V4	5322 130 34047
BZX 75-C2V1	5322 130 34049
BZX 79-C2V7	5322 130 34563
BZX 79-C3V9	5322 130 30411
BZX 79-C5V6	5322 130 30759
BZX 79-C8V2	5322 130 34382
BZX 78-C10	5322 130 30774
BZX 79-C51	5322 130 34166
BZY 88-C3V3	5322 130 30372
BZY 79-C7V5	5322 130 30666

High Frequency Transistors

Type	Ordering Number
BFR 90	5322 130 44179
BFW 92	5322 130 40745
BFX 89	5322 130 40542

Light Emitting Diodes

Type	Ordering Number
TIL 209	5322 130 34335
XC 209 A	5322 130 34517
OL 31	5322 134 84011
LD 35–11	5322 130 34562

Field Effect Transistors

Type	Ordering Number
BF 256 A	5322 130 44418
E 411	5322 130 44578

Low Frequency Transistors

Type	Ordering Number
BC 108 B	5322 130 40343
BC 178 B	5322 130 40348
BC 337	4822 130 40855
BC 548 B	4822 130 40937
BC 557	5322 130 44256
BC 557 B	4822 130 40973
BC 558 B	5322 130 44197

Small Signal Diodes

Type	Ordering Number
BAV 10	5322 130 30594
BAV 20	5322 130 34189
BAW 62	5322 130 30613

Switching Transistors

Type	Ordering Number
BDX 35	5322 130 44417
BSS 68	5322 130 44247
2N 2369	5322 130 40407

Rectifier Diodes

Type	Ordering Number
BY 126	5322 130 30192
BY 210–400	4822 130 30868
BY 210–600	4822 130 30868
BY 206	4822 130 30839
BY 207	4822 130 30868

Tuner Diodes

Type	Ordering Number
BA 182	5322 130 30644
BA 280	5322 130 34302
BA 379	5322 130 34364
HP 5082–2835	5322 130 34283

Thyristors

Type	Ordering Number
BRY 39	5322 130 40482
BT 100 A–300 R	5322 130 24035

Rectifier Bridges

Type	Ordering Number
BY 164	5322 130 30414

Displays

Type	Ordering Number
ZM 1500-9	5322 131 94027
BRO 9253	5322 131 94042
MAN 72	5322 209 85455
CQY 81	5322 130 34524

Unless otherwise is stated any manufacturer's equivalent type can be used for replacement

Low Power Schottky TTL

Type	Ordering Number
SN 74LS00 N	5322 209 84823
SN 74LS02 N	5322 209 85312
SN 74LS04 N	5322 209 84984
SN 74LS10 N	5322 209 84996
SN 74LS54 A	5322 209 85406
SN 74LS74 N	5322 209 84986
SN 74LS75 N	5322 209 85269
SN 74LS90 N	5322 209 85255
SN 74LS157 N	5322 209 85001
SN 74LS175 N	5322 209 84999

CMOS

Type	Ordering Number
GZF 1201 P*	5322 209 84722
MC 14076 CP	5322 209 14025
F 340 01 PC	5322 209 84976
F 34024 PC	5322 209 14024
F 34040 PC	5322 209 14022
F 34049 PC**	5322 209 14018
F 34050 PC	5322 209 14021
CD 4093 BE	5322 209 85412
F 34556 PC	5322 209 14023
HEF 4737 V	5322 209 14511

* Use only Elcoma's GZF 1201 P or HEF 4737 V for replacement

** Selected

High Frequency Amplifiers

Type	Ordering Number
OM 185*	use OM 334
OM 185	use OM 335
OM 334	5322 209 85414
OM 335	5322 130 44419

* selected

High Speed Schottky TTL

Type	Ordering Number
SN 74S00 N	5322 209 84167
SN 74S02 N	5322 209 80234
SN 74S64 N	5322 209 84724
SN 74S74 N	5322 209 84183
SN 74S112 N	5322 209 84237
SN 74S196 N	5322 209 85198
82S90 A	use SN 74S196 N

Voltage Regulators

Type	Ordering Number
723 PC*	5322 209 84655
MC 7805 P	5322 209 84454
MC 79050 P	5322 209 85456
MP 78 G	5322 209 85565

* Don't use Motorolas 723 for replacement

ECL

Type	Ordering Number
GXB 10110	5322 209 85409
MC 1651 L	5322 209 85408
MC 10102 P	5322 209 84643
MC 10116 K	use MC 10216 P
MC 10216 P	5322 209 84825

Standard TTL

Type	Ordering Number
SN 7400 N	5322 209 84528
SN 7402 N	5322 209 80234
SN 7403 N	5322 209 84529
N 7403 AN*	5322 209 84628
SN 7410 N	5322 209 80077
SN 7442 N	5322 209 80142
SN 7451 N	5322 209 84286
SN 7474 N	5322 209 84165
SN 7475 N	5322 209 80059
SN 7490 AN	5322 209 80072
SN 74247 N	5322 209 85457

* Use only N 7403 AN for replacement

High Speed Dividers

Type	Ordering Number
SP 600 B	use SP 8600 B
SP 616 B	use SP 8616 B
SP 670 D	use SP 8670 B
SP 8600 B	5322 209 84729
SP 8616 B	5322 209 84725
SP 8670 B	5322 209 84721
F 11C90 C	5322 209 85458
MC 1697 P	5322 209 85859

Miscellaneous

Type	Ordering Number
MC 1741 CP1*	5322 209 85254
DM 8884 AN	5322 209 84723
SN 72710 P**	5322 209 85205
SN 72741 P*	5322 209 85254
SN 75107 N	5322 209 84304

* can be replaced by any μA 741

** can be replaced by any μA 710

Switches	PM 6610 Series	PM 6620 Series	PM 6661/64
Power on	5322 101 94007	5322 101 94007	5322 276 14358
Function	5322 273 84014*	5322 273 74008	
Push button 2 pole	5322 276 14117	5322 276 14117	
Push button 4 pole	5322 276 14102		
Slide for printed board	5322 277 24006	5322 277 24006	
Slide for panel	5322 277 24017	5322 277 24017	
Ornaments			
Front	5322 466 85335	5322 466 85335	5322 460 64022
Rear	5322 459 24054	5322 459 24054	
Cover			
Top	5322 447 84467	5322 447 84467	
Bottom	5322 447 84466	5322 447 84466	
Transformers			
Mains	5322 146 14079	5322 146 14079	5322 146 14125
DC to DC	5322 142 64027	5322 142 64027	
Windows	5322 450 64059	5322 450 64059	5322 459 24066
Feet			
Rear	5322 462 44181	5322 462 441 81	
Bottom	5322 462 44179	5322 462 44179	5322 462 44292
Plug	4822 462 70497	4822 462 70497	

* 5322 273 74007 for PM 6612

Textplates

Item	Ordering Number
PM 6611	5322 456 14038
PM 6612	5322 456 14043
PM 6613	5322 456 14041
PM 6614	5322 456 14044
PM 6615	5322 456 14045
PM 6616	5322 456 14067
PM 6622	5322 456 14054
PM 6624	5322 456 14055
PM 6625	5322 456 14056
PM 6661	5322 456 14057
PM 6664	5322 456 14058

Handle

Item	Ordering Number
Arm	5322 498 54048
Profile	5322 498 54044
Bearing bush	5322 520 34164
Knob	5322 414 64053
Spring	5322 530 84075
Plate	5322 528 34101

Sockets

Item	Ordering Number
Mains	5322 265 30066
Ext. battery	5322 267 34059
Miniature	5322 268 24073
BNC, high freq.	5322 321 34205
BNC, standard	5322 267 10004

Fuses

Item	Ordering Number
100 mA	4822 253 20006
200 mA	4822 253 20009
1.6 A	4822 253 20022
Thermal	4822 252 20001

IC Holders

Item	Ordering Number
14 pins	5322 255 44082
16 pins	5322 255 44107
18 pins	5322 255 44112

Knobs

Item	Ordering Number
Push button	5322 414 14011
Function	5322 414 34076
Potentiometer	5322 414 34091

Male Connectors

Item	Ordering Number
For oscillator card	5322 265 44064
For prescaler card	5322 265 54018
5 pins	5322 265 64062

Female Connectors

Item	Ordering Number
5 pin in line	5322 265 54006
10 pin in line	5322 265 54006
16 pin dual in line	5322 255 44107

Cables with connectors

Item	Ordering Number
To lamp indicator card	5322 321 24389
To function selector card	5322 321 24391

Cover for knobs

Item	Ordering Number
Function	5322 414 74019
Potentiometer	5322 414 74015

Guide Rails

Item	Ordering Number
For basic card	5322 462 34127
For prescaler card	5322 462 34054

Distance Pieces

Item	Ordering Number
For oscillator card	5322 535 94709
For prescaler card	5322 535 94711

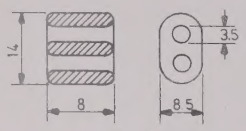
Transistor Holders

Item	Ordering Number
In Line	5322 265 54006
TO 18	5322 255 40089

Miscellaneous

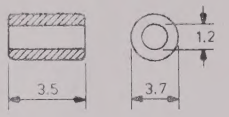
Item	Ordering Number
Fuse Holder	5322 256 34031
Extension bar	5322 535 44668
Cap for fuse	5322 462 44291

Ferroxcube Beads
Manufacturer: Elcoma
Description: Twin bead



Grade	Ordering Number
4 B 1	5322 526 10419

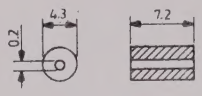
Ferroxcube Beads
Manufacturer: Elcoma
Description: Single bead



Grade	Ordering Number
3 B*	4822 526 10011
4 B 1**	4822 526 10025

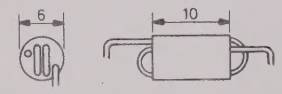
* Red marking
** Yellow marking

Ferroxcube Cores
Manufacturer: Elcoma
Description: Tube core



Grade	Ordering Number
3 B	4822 526 10097

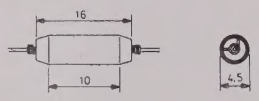
High Frequency Chokes
Manufacturer: Elcoma
Description: Choke with six axial holes and 2.5 turns of tinned copper wire



Grade	Ordering Number
3 B	5322 158 10052

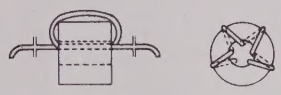
High Frequency Chokes
Manufacturer: Siemens
Type: 882111

Rated current: 0.2 A
Tolerance: 20 %
First resonance frequency: 28 MHz



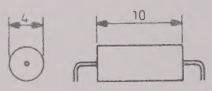
Inductance, μH	Ordering Number
40	5322 121 44253

High Frequency Chokes
Manufacturer: Factory part
Description: Ferroxcube bead with 5 turns of tinned copper wire



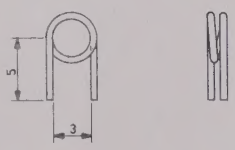
Ordering Number
5322 158 14119

Shielded RF Coils
Manufacturer: Delevan
Type: 2307



Inductance, μH	Ordering Number
0.68	5322 158 10289
1	5322 158 10311
4.7	5322 158 10276
10	5322 158 10222
47	5322 158 10284
100	5322 158 10243

Inductors
Manufacturer: Factory part
Description: Coil with 1.5 turns of tinned copper wire



Ordering Number
5322 157 44024